

Bilateral Paravertebral Nerve Catheters for Control of Perioperative Pain in the Adolescent Undergoing a Nuss Procedure

 Elia R. Rieder, MD, Fernando A. Vazquez, MD, Andrew Davis-Sandfoss MD, Jonathan Metry, MD

INTRO

- Pectus excavatum (PE) is the most common chest wall deformity
- Often corrected with the minimally invasive, Nuss procedure in adolescence
- Extensive pre-operative work-up with pulmonary function tests to assess for restrictive disease, echocardiography to assess cardiac and great vessel anatomy, ventricular function and valvular insufficiency, chest x-ray, and assessment for allergy to metals
- Pain after the Nuss procedure can be more significant than the Ravitch procedure.²
- Suboptimal pain management has been shown to negatively affect deep breathing, early mobilization, and length of hospital stay.
- Paravertebral nerve blocks (PVNB) and erector spinae plane blocks (ESPB) have, recently, garnered interested due to decreased risk of adverse effects such as urinary retention, hypotension and neuraxial injury.^{2,3}

CASE REPORT

- 17 yo 66 kg male who presented for Nuss bar placement for pectus excavatum deformity
- He reported chest pain with coughing, sneezing, and certain movements
- Pulmonary function tests showed no abnormalities. Echocardiography showed left sided aortic arch and mild pulmonary/tricuspid regurgitation.
- Computed tomography demonstrated severe pectus excavatum with a Haller index of 4.9, making the patient a candidate for surgical correction.
- Patient underwent sterile ultrasound-guided placement of bilateral T6 paravertebral nerve catheters after sedation with 2 mg of midazolam and 50 mcg of fentanyl.
- 17 G Tuohy needle was advanced into the T6 paravertebral spaces using the sagittal paramedian approach (fig. 1), catheters were placed, and 10 ml of 0.2% ropivacaine was administered into each catheter
- Intraoperatively, the patient was given 30 mg of ketamine and 0.4 mg of hydromorphone.
- Postoperatively, 6 ml per hour of 0.1% bupivacaine was given through each catheter until removal on post-operative day (POD) three.
- During the first three post-operative days, the patient's pain scores ranged from 1/10 to 3/10. Prior to discharge on POD 4, the patient's pain was well controlled with scheduled ibuprofen and acetaminophen.



Bilateral paravertebral catheters resulted in excellent objective and subjective analgesia, minimized opioid requirement, and resulted in no perioperative complications.

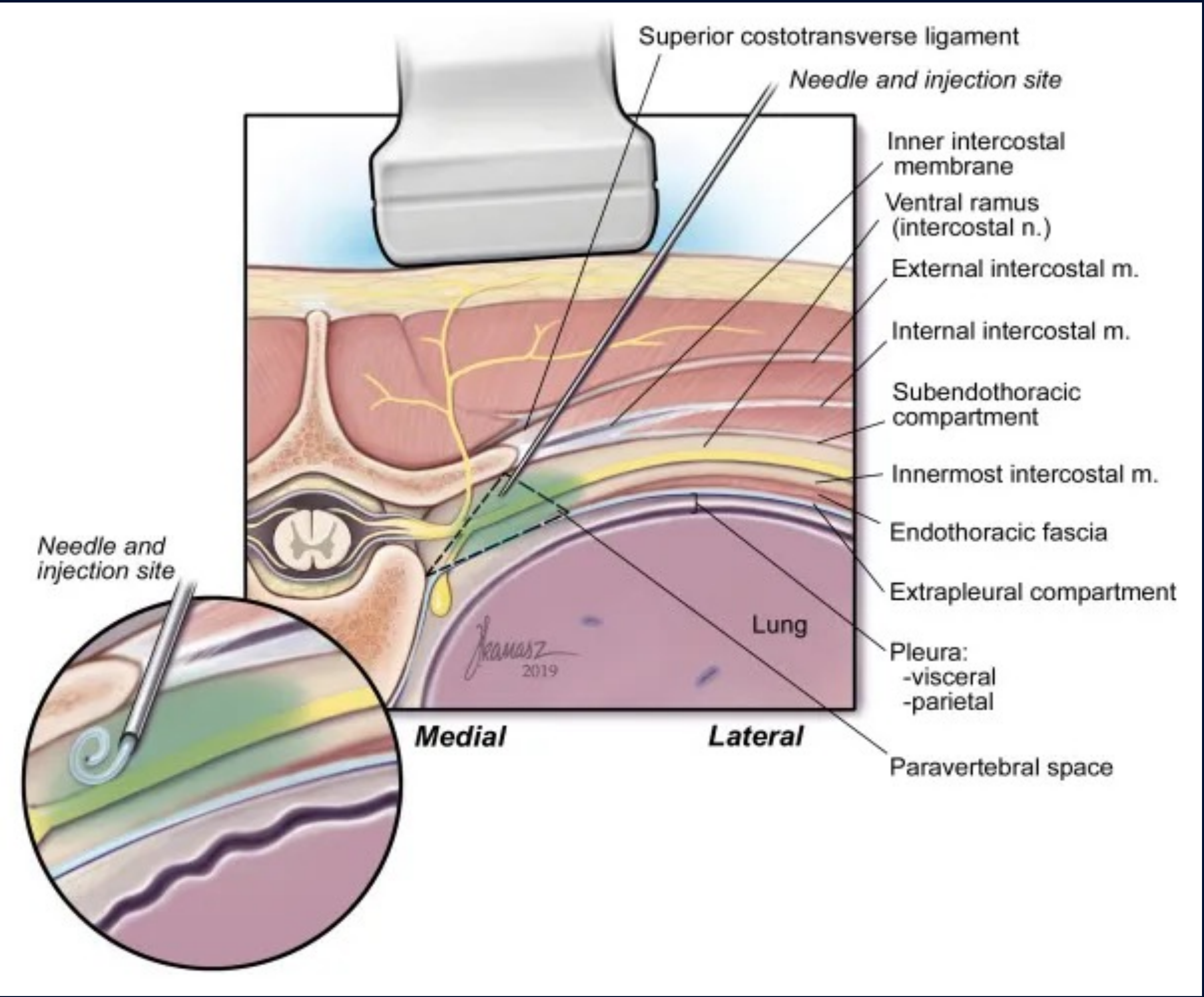


Figure 2

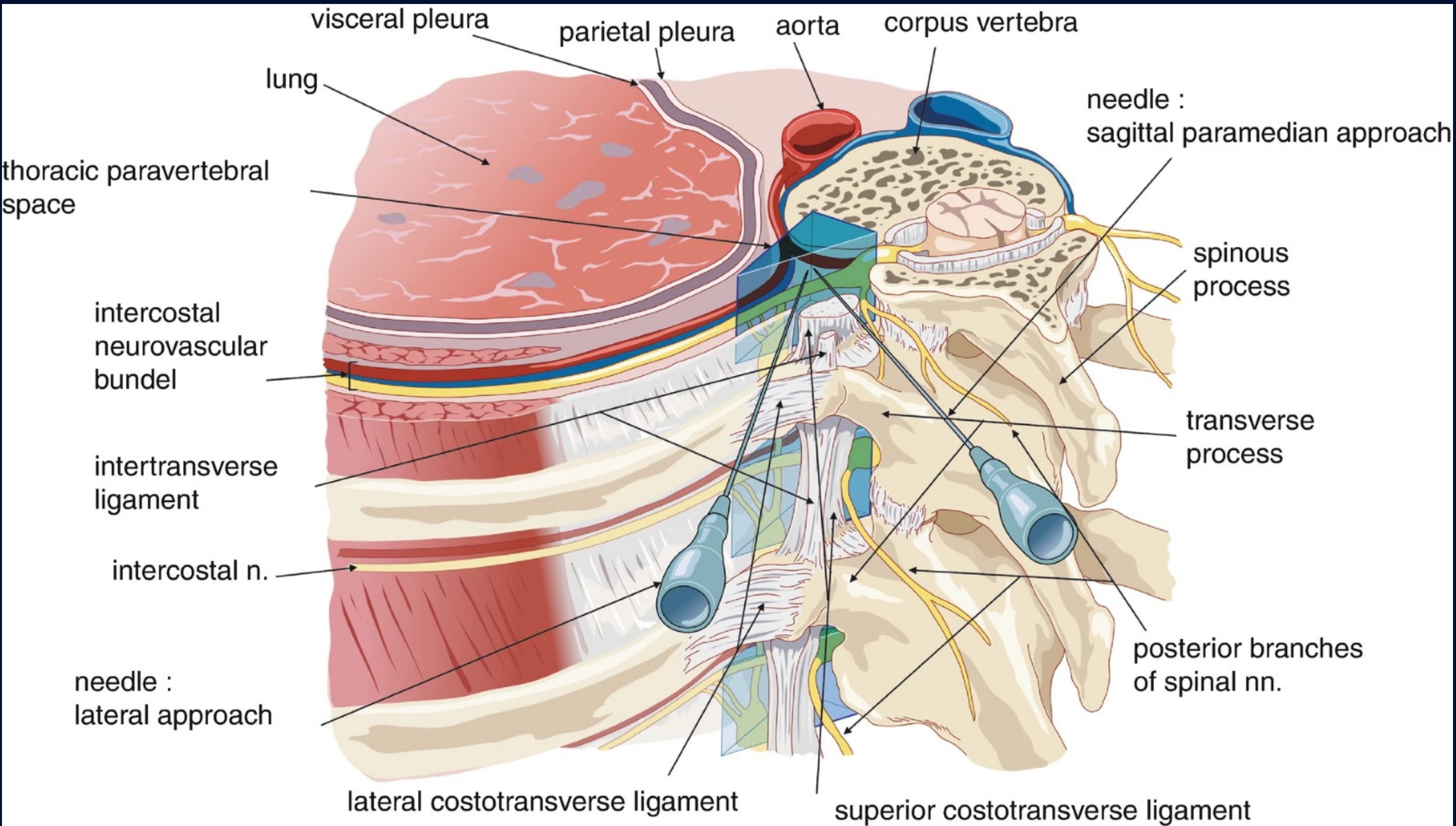


Figure 1

Paravertebral nerve catheters are a safe and effective analgesic plan for pediatric patients undergoing Nuss procedures for Pectus Excavatum.

DISCUSSION

- Recent shift to placement of paravertebral nerve blocks, shown to have equivalent analgesia with a better side effect profile than thoracic epidural for adult thoracotomy patients.^{1,4}
- Erector Spinae Plane Blocks (ESPB) have also been employed as an alternative to TE.
- While TEs offer excellent analgesia, they can be difficult to place and have a failure rate of up to 30%.
- There have been reports of permanent neurologic injury following thoracic epidural placement in patients undergoing the Nuss procedure.¹
- Sympathectomy and local anesthetic blockade of cardioaccelerator fibers can impair hemodynamic control after placement of a TE
- PVNB in pediatric patients have generally been reported to have equivalent analgesia when compared to TE and a more favorable side effect profile
- PVNB still carries risk of pneumothorax and vascular injury

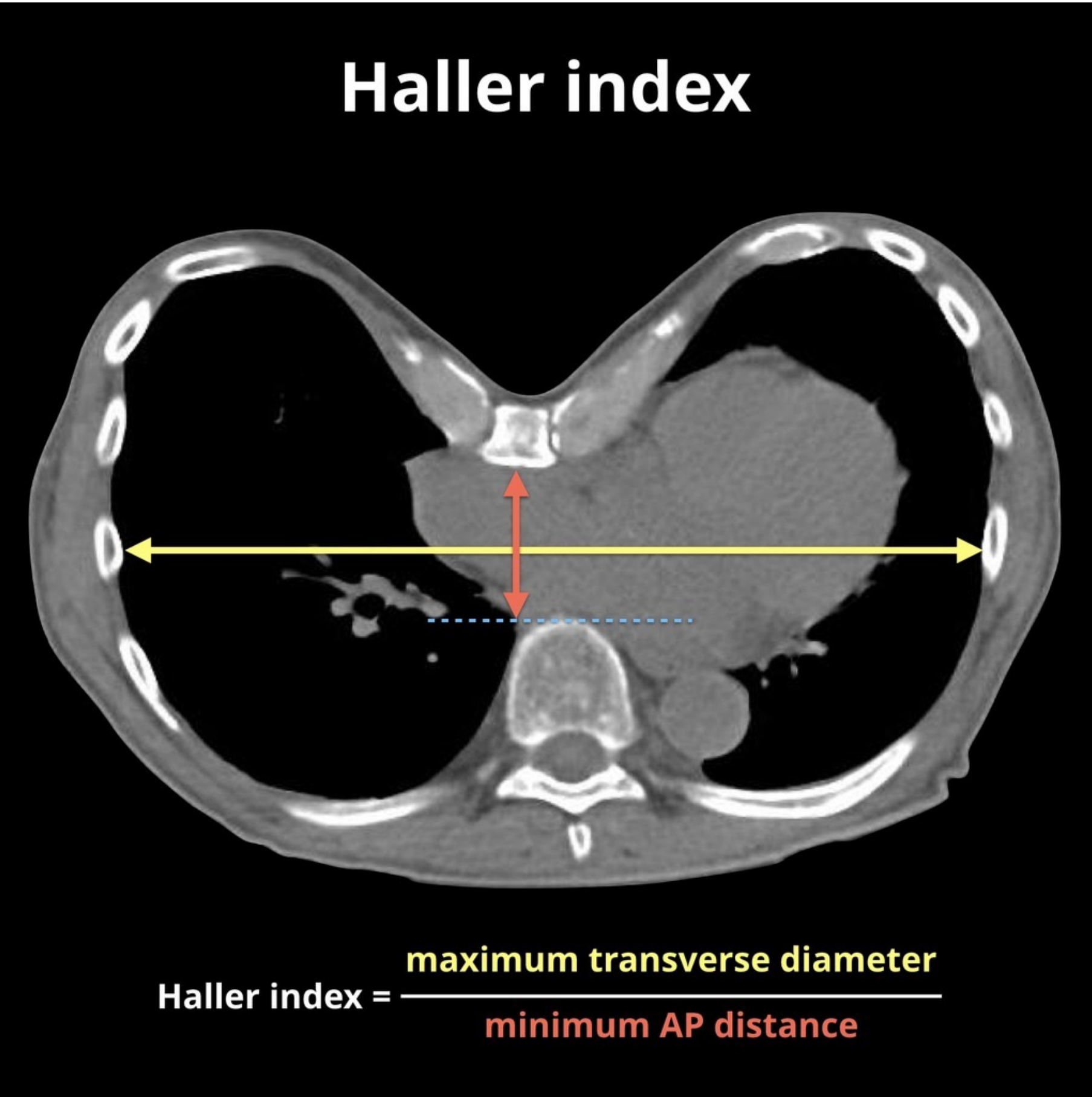


Figure 3

References

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