

Thoracic Epidural as a Therapeutic Bridge Alongside Cryoablation for Rib Fractures

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Introduction

- Thoracic epidural is commonly used as analgesia for rib fractures to reduce mortality, length of hospital stay, and pulmonary complications [1]
- Limitations of thoracic epidurals include limited therapy duration of a few days due to concern for infection and necessity of hospitalization
- Intercostal nerve cryoablation, commonly used for surgical stabilization of rib fractures, can potentially be used for longer term pain control [2]
- Intercostal nerve cryoablation usage and effectiveness alongside thoracic epidural for analgesia in non-surgical stabilization patients is not commonly employed
- We present a case of a patient with multiple rib fractures who received intercostal nerve cryoablation for longer term pain control in addition to thoracic epidural

Materials and Methods

- IRB exempt as per Lifespan policy
- Patient chart review over course of hospitalization

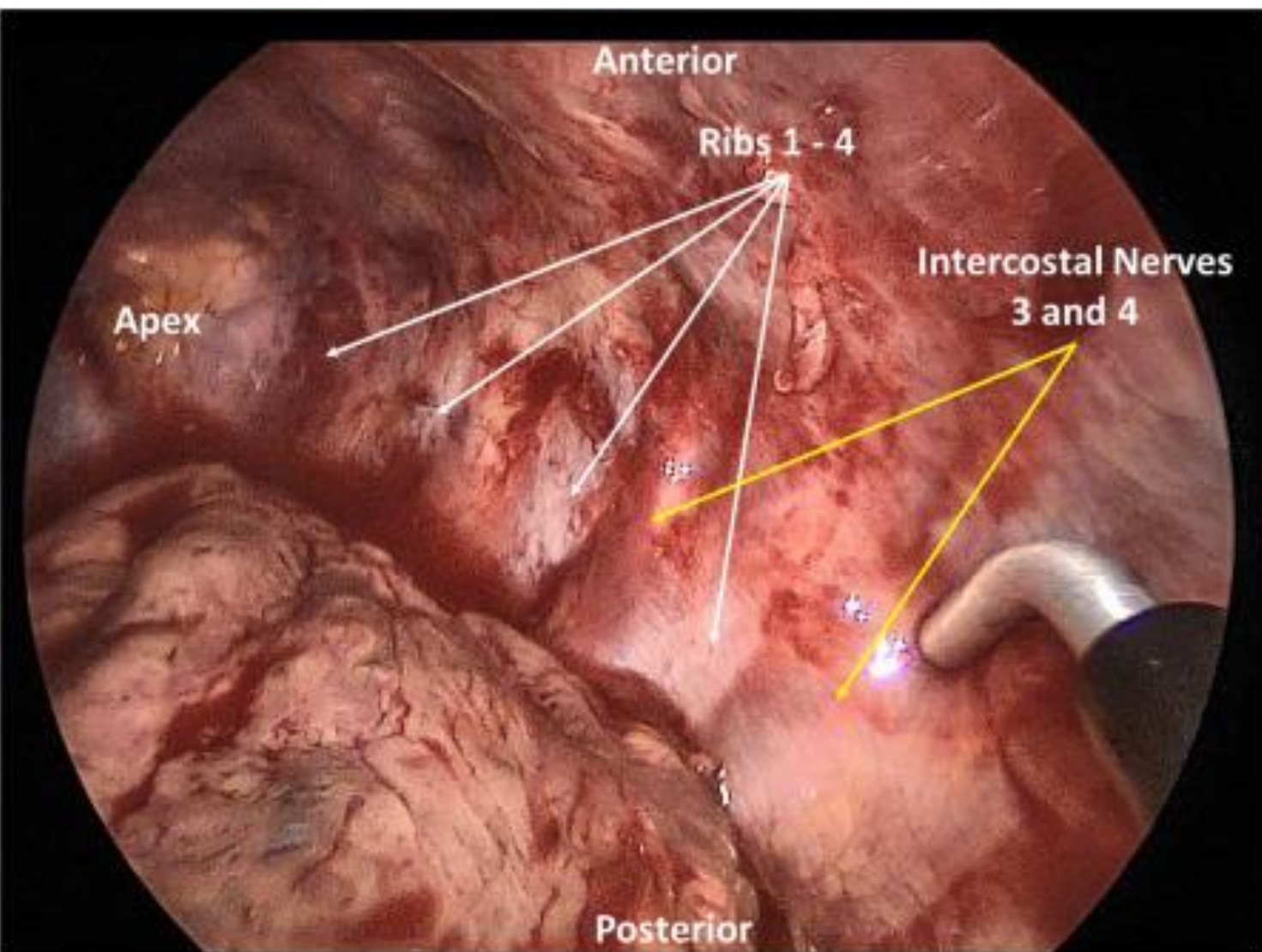


Figure 1: Intraoperative VATS Intercostal Nerve Cryoablation [3]

Case Report

- 49-year-old male w/o significant PMHx presented with **bilateral rib fractures (L2-11, R 2-5)**, pneumothorax requiring chest tubes, manubrium fracture, and multiple thoracic and lumbar spinal fractures requiring posterior spinal decompression and fusion
- **Difficulty breathing** due to pain from rib fractures—on 2L O2 w/ reduced breath sounds
- Initial analgesia-PO oxycodone and IV hydromorphone as needed, valium, scheduled Tylenol and gabapentin
- CT-hemothorax developing on L side and needed evacuation
- **Procedure:** L side thoracotomy w/ washout and clot evacuation and **L 3-9 intercostal nerve cryoablation with post-op thoracic epidural placement**
- Epidural: T4-T5 level using loss of resistance technique. Position tested using 3 mL of lidocaine-epinephrine (PF) 1.5%-1:200,000. Continuous infusion was ran w/ Bupivacaine (PF) 0.1% in NS at 8 cc/hr.
- Pre- and post- intervention pain control, respiratory and physical therapy parameters are presented in **Table 1**
- Epidural was discontinued after 4 days, and rest of hospitalization was uneventful

	Pre-Epidural and Cryoablation	Post-Epidural and Cryoablation
Overall Mean Numerical Rating Scale (NRS) Pain Score	7.8	8
Chest Mean Numerical Rating Scale (NRS) Pain Score	7	7
Opioid Consumption in Morphine Milli-Equivalents (milligrams)	423.75	378.75
Mean Volume of Breaths During Incentrive Spirometry (milliliters)	1250	1500
Physical Therapy	Bed Exercises	Out of Bed Exercises

Table 1: Pain scores, opioid consumption, breath volumes, and participation with physical therapy pre- and post-epidural and cryoablation. There is a decrease in opioid consumption, increase in breath volumes, and greater ability to participate with physical therapy post-intervention.

Discussion

- Cryoablation is often used in conjunction with surgical stabilization of ribs and the effects can last for 6-9 months; however, it may take 10-14 days to achieve maximal effect [4]
- Thoracic epidural can be a useful bridge in the meantime
- Our patient demonstrated decreased opioid consumption, increased incentive spirometry volumes, and could engage more with physical therapy despite reporting similar pain scores.
- 6 weeks post-op, patient reported good pain control of his chest area
- Thoracic epidurals may also be a useful bridge in patients who receive bedside ultrasound guided intercostal cryoablation due to the delay in achieving desired effect
- Other regional anesthetic techniques may also be performed; however they are inferior to epidurals [5]
- Currently, there is limited literature on the usage and analgesic outcomes of thoracic epidural in conjunction with intercostal cryoablation for rib fractures
- Future studies may aim to fill this gap

References

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