

Successful Use of Transcutaneous Intercostal Nerve Cryoablation for Uncontrolled Pain from Minimally Displaced Rib Fractures in a Case of Concomitant Trauma and Burns



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Introduction

- Non-operative management of traumatic rib fractures is largely supportive, with its basis on adequate analgesia. However, oral and IV pain medications can sometimes be inadequate to effectively manage symptoms
- Intercostal nerve cryoablation (INC) is a procedure that uses targeted CO₂ boluses to freeze and destroy intercostal nerves for pain relief
- Currently, INC has been used intraoperatively as an adjunct in thoracic surgeries with some success in patients with limited options for uncontrolled pain
- However, its use in the nonoperative setting and transcutaneously has not been well documented in the literature

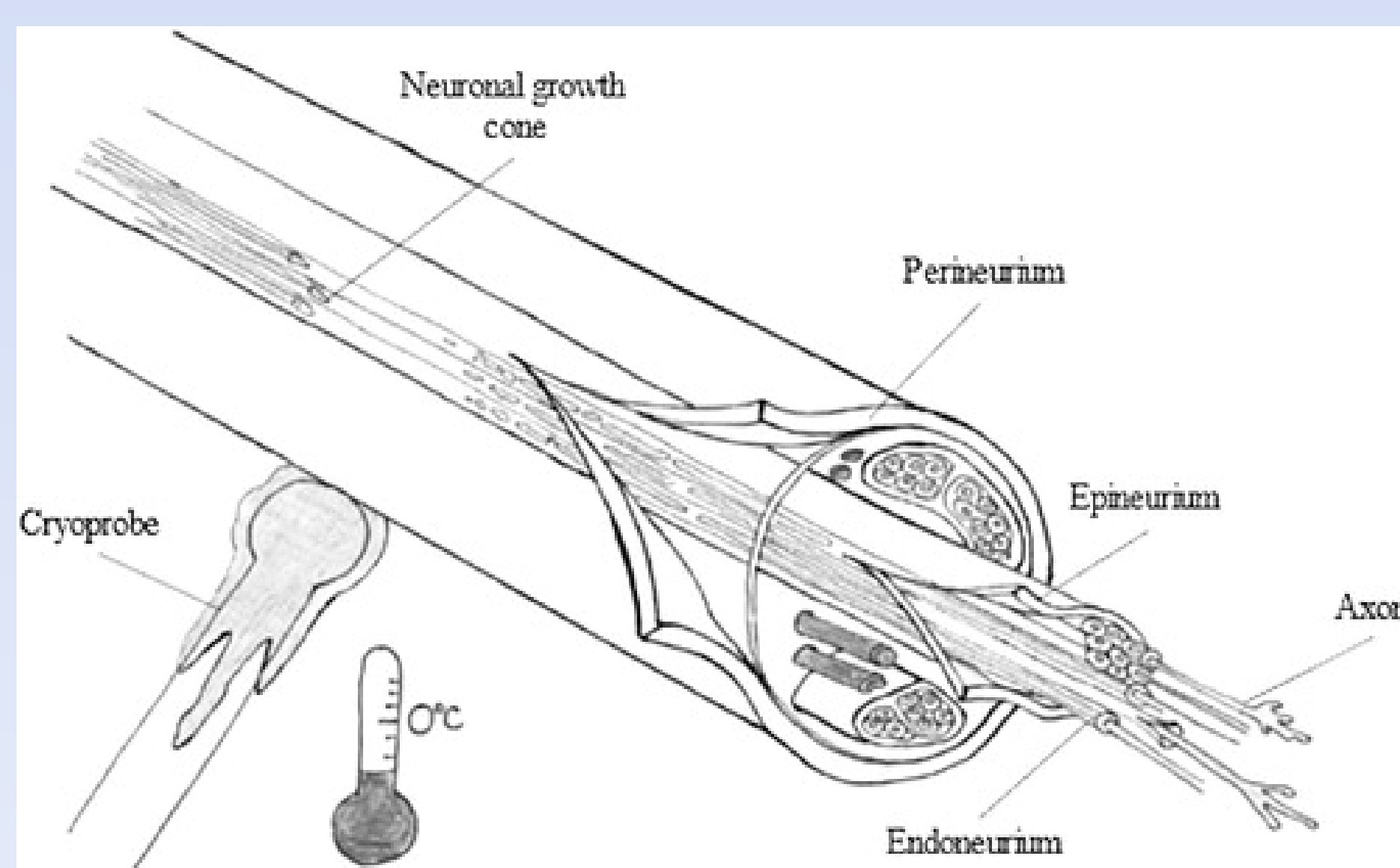


Image 1: Demonstration of nerve cryoablation.
Image credit: Krista Lai et al.¹

Methods

We present a case of a 42-year-old male who sustained traumatic rib fractures with overlying burn injuries that ultimately necessitated transcutaneous intercostal nerve cryoablation (TINC). Post procedure, rib pain was adequately controlled for weeks, and participation in physical therapy improved.



Image 2: burn injury to back and flank

References

1. Intercostal Nerve Cryoablation for Postoperative Pain Control in Pediatric Thoracic Surgery: A Scoping Review. Krista Lai, R. Scott Eldredge, Michael Zobel, Angela Hargis-Villanueva, Andrew Ostlie, and Benjamin E. Padilla. Journal of Laparoendoscopic & Advanced Surgical Techniques 2023 33:10, 994-1004

Case Report

- 42-year-old man hit an electrical line while driving a tractor, sustained electrical burns, then fell 12 feet onto his right side as he was escaping
- Suffered 18% TBSA deep partial-thickness burns to his right chest, flank, back, and right lower extremity. CT scans revealed minimally displaced right posterior 6th-9th rib fractures and mild pulmonary contusions (Images 2 & 3)
- While inpatient, he had 10/10 right-sided flank pain and difficulty taking deep breaths, moving, and coughing effectively despite maximal use of systemic multimodal and opiate analgesics.
- Unable to place indwelling epidural or paraspinal catheter for regional anesthetic administration or undergo rib fixation due to extensive burn injuries overlying his rib fractures.
- On hospital day 3, bedside TINC was successfully performed under ultrasound guidance with local anesthesia to his 6th-9th right intercostal nerves through the burn wound and was well tolerated (Image 4)
- The following day, he appeared visibly more comfortable and stated significant improvement in his right-sided flank pain, rated as a 2/10. He was able to move out of bed and participate with physical therapy more comfortably and eagerly.
- By discharge on hospital day 14, his pain and mobility had significantly improved.
- At his follow up visit 30 days after injury, he said that he had minimal flank pain, and his only symptom was numbness over the area where TINC was performed.



Image 3: CT reconstruction of rib fractures

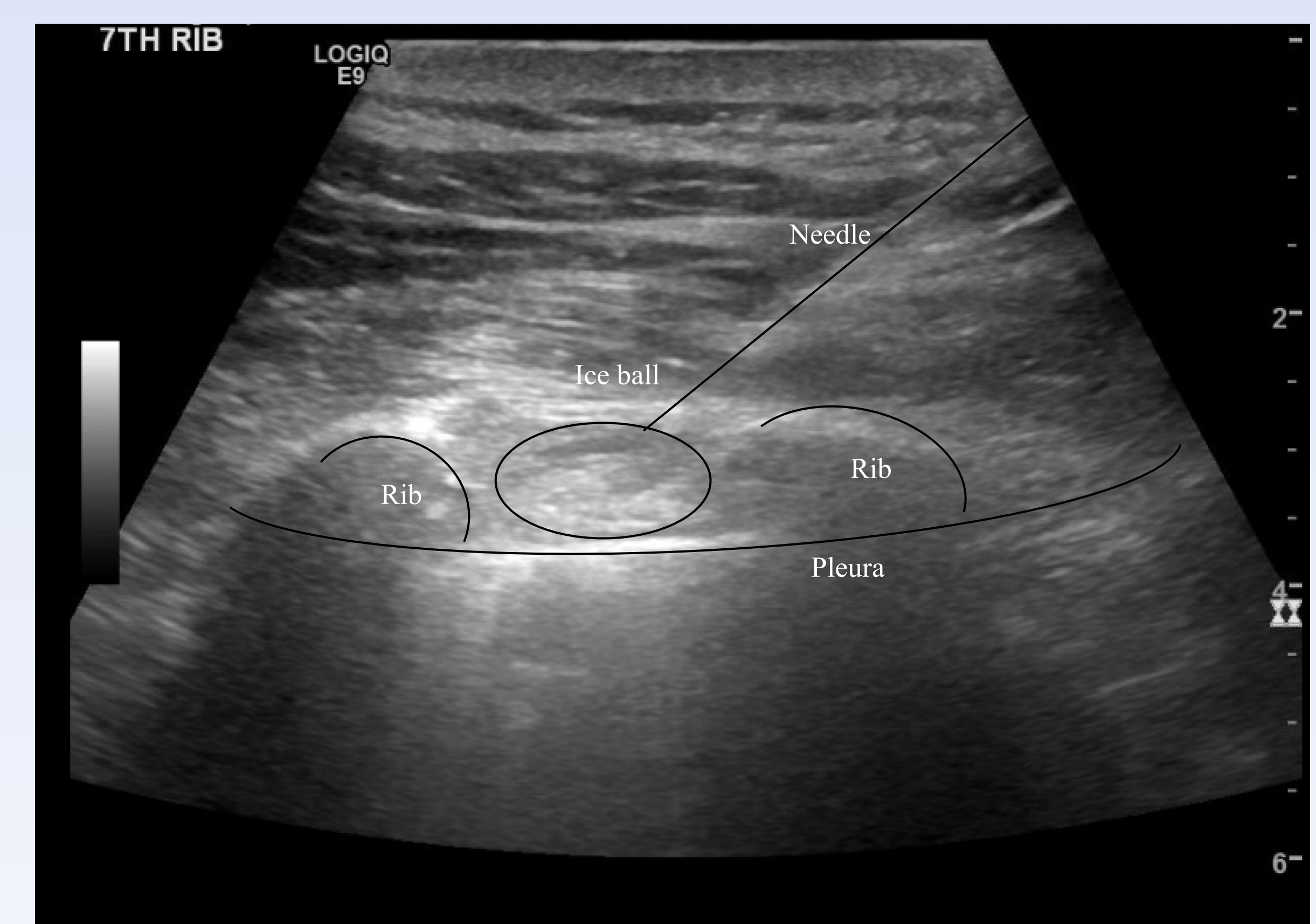


Image 4: Ultrasound of ice ball in between ribs during TINC

Conclusion

- This case report demonstrates an instance where options for adequate pain control were limited in a patient with extensive burn injuries overlying rib fractures.
- His burn wounds prevented the use of rib fixation or indwelling catheters for locoregional control for debilitating pain from his rib fractures.
- The use of ultrasound guided TINC successfully led to effective, long-lasting pain control.
- This case highlights the potential of TINC as an important tool for long-term, non-operative management of patients with severe pain from traumatic rib fractures.

Acknowledgements

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