



Just A Small Incision: Post-Operative Analgesia For A Surprise Sternotomy

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ASRA PAIN
MEDICINE



INTRODUCTION

- Poor pain control after sternotomy associated with respiratory complications (1), increased myocardial oxygen demand (2), delayed mobilization (3), and prolonged hospital stay (4)
- Persistent acute pain post-sternotomy requiring opioids also associated with the development of chronic pain (5)
- Pectointercostal fascial plane block targets anterior cutaneous branches of intercostal nerves 2-6, which innervate the sternum.
- Parasternal blocks associated with decreased post-operative pain and opioid consumption (6, 7)

CASE VIGNETTE

- 71/F, h/o thymoma with prior excision was scheduled for repeat mass excision, thymic resection, and possible partial upper sternotomy.
- PMH: hypertension, hyperlipidemia, type 2 diabetes mellitus, alcohol use disorder.
- Home meds: losartan, atorvastatin, metformin, quetiapine
- Pre-op physical examination, laboratory values, and other tests unremarkable.
- Pre-procedure huddle: surgical team claims resection possible through typical mediastinoscopy incision, minimal chance of conversion to sternotomy.

CASE DETAILS

- Plan: GETA, large-bore IV access.
- Intra-op: attending surgeon enters the OR and immediately prepares for sternotomy. Arterial line placed. Case otherwise uneventful and patient extubated.
- Post-op: Patient reported significant pain in the PACU. After obtaining informed consent from family, T4-5 epidural catheter was placed. 10mL of 0.2% ropivacaine was administered through the epidural catheter, resulting in significant pain reduction. Epidural bupivacaine 0.05% and hydromorphone 10mcg/mL infusion started at 5mL/hr.
- POD 1: Patient still with significant pain. Unable to increase epidural infusion rate due to hypotension
- POD 2: epidural infusion changed to bupivacaine 0.05% only and PO oxycodone PRN ordered. Epidural infusion briefly paused but restarted when pain increased significantly. Epidural removed. Bilateral pectointercostal fascial plane catheters placed. Intermittent bolus dosing with 0.2% ropivacaine 6mLs q2hrs
- POD 3-6: improvement in pain
- POD 7: parasternal catheters removed
- POD 8: patient discharged home

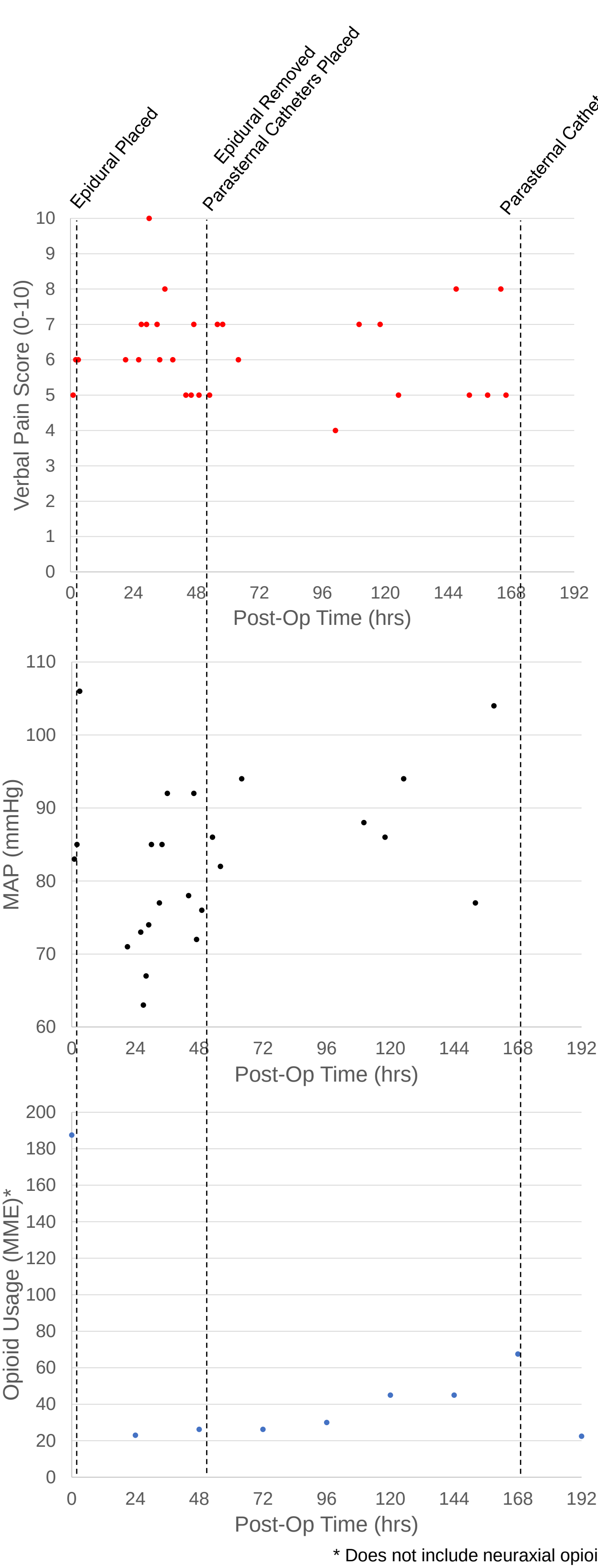


Figure 1. Verbal pain scores (0-10), MAP (mmHg), and opioid usage (MME) over time in the patient's post-operative course
* Does not include neuraxial opioids

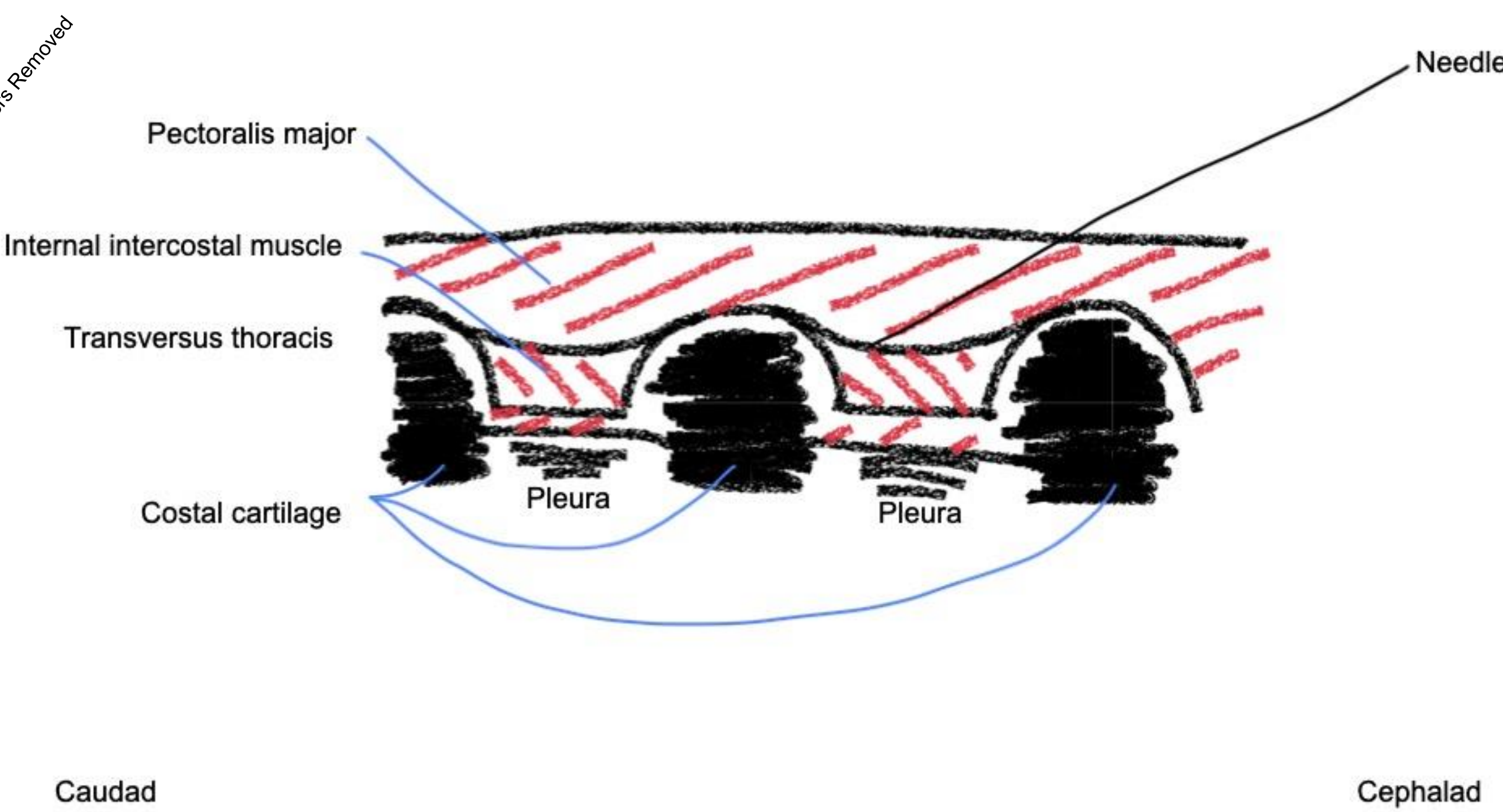


Figure 2. Schematic diagram of the pectointercostal fascial plane block.

DISCUSSION

- Patient's acute post-sternotomy pain inadequately controlled with an epidural due to hypotension but improved after placement of bilateral pectointercostal fascial plane catheters
- Advantages: possibility of placement in an anticoagulated patient, less effect on hemodynamics, easier positioning
- Disadvantages: surgical dressing may obstruct catheter placement (although in our experience surgical teams have been willing to redress), risk of pneumothorax, hemothorax, pericardial puncture, IMA injury, neurovascular bundle injury
- Inconsistent results from studies—true benefit of parasternal blocks unclear and continued investigation warranted

REFERENCES

1. Sasseron AB, Figueiredo LC, Trova K, Cardoso AL, Lima NM, Olmos SC, Petrucci O. Does the pain disturb the respiratory function after open heart surgery? Rev Bras Cir Cardiovasc. 2009 Oct-Dec;24(4):490-6. English, Portuguese. doi: 10.1590/s0102-76382009000500010. PMID: 20305922.
2. Zubrzycki M, Liebold A, Skrabal C, Reinelt H, Ziegler M, Perdas E, Zubrzycka M. Assessment and pathophysiology of pain in cardiac surgery. J Pain Res. 2018 Aug 24;11:1599-1611. doi: 10.2147/JPR.S162067. PMID: 30197534; PMCID: PMC6112778.
3. Gan TJ. Poorly controlled postoperative pain: prevalence, consequences, and prevention. J Pain Res. 2017 Sep 25;10:2287-2298. doi: 10.2147/JPR.S144066. PMID: 29026331; PMCID: PMC5626380.
4. Dowling R, Thielmeier K, Ghaly A, et al. Improved pain control after cardiac surgery: Results of a randomized, double-blind trial. J Thorac Cardiovasc Surg 2003;126:1271–8.
5. Kleiman AM, Sanders DT, Nemergut EC, Huffmyer JL. Chronic Poststernotomy Pain: Incidence, Risk Factors, Treatment, Prevention, and the Anesthesiologist's Role. Reg Anesth Pain Med. 2017 Nov/Dec;42(6):698-708. doi: 10.1097/AAP.0000000000000663. PMID: 28937533.
6. Barr AM, Tutungi E, Almeida AA. Parasternal intercostal block with ropivacaine for pain management after cardiac surgery: a double-blind, randomized, controlled trial. J Cardiothorac Vasc Anesth. 2007 Aug;21(4):547-53. doi: 10.1053/j.jvca.2006.09.003. Epub 2006 Dec 22. PMID: 17678782.
7. Liu V, Mariano ER, Prabhakar C. Pecto-intercostal Fascial Block for Acute Poststernotomy Pain: A Case Report. A A Pract. 2018 Jun 15;10(12):319-322. doi: 10.1213/XAA.0000000000000697. PMID: 29293481.