

Case of Continuous Deep Parasternal Plane Block in Sternal Fracture

Eileen Hu, MD¹ Jeff Xu, MD, FASA¹

¹Westchester Medical Center, Valhalla, NY, USA

BACKGROUND

- Sternal fractures commonly result from blunt anterior chest trauma.
- Severe pain from sternal fracture can lead to pulmonary complications such as atelectasis and pneumonia.

CASE DESCRIPTION

- An 80-year-old female presents as the restrained driver in a motor vehicle accident.
- She had mildly displaced sternal fracture and nondisplaced right 1st through 8th rib fractures. The patient had severe midline anterior chest pain despite a multimodal pain medication regimen. Deep breathing was limited by pain.
- Bilateral deep parasternal plane pain catheters were inserted using an in-plane ultrasound guided technique and 4-inch 18g Tuohy needle between ribs 3 and 4.
- 10mL of 0.25% bupivacaine was bolused through the needle with instant pain relief.
- A continuous ropivacaine 0.2% infusion ran for four days total with significantly improved pain and respiratory status. The infusion was down titrated and the catheters were removed once the pain was able to be managed with oral medication.
- The patient was discharged on day 10 of hospitalization to a subacute rehabilitation facility.

FIGURES

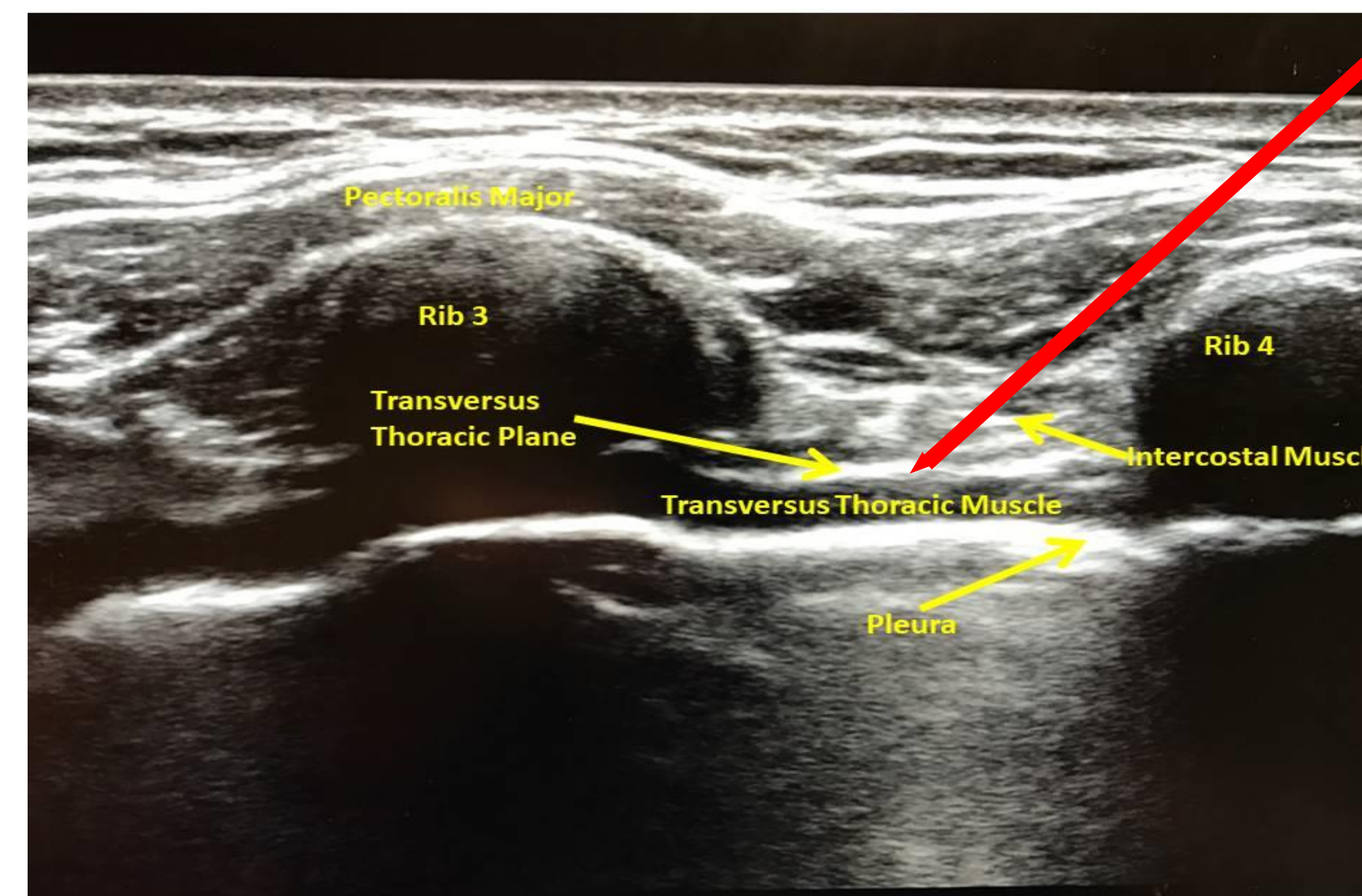


Figure 1. Adapted from ASRA Newsletter 2020. The red line illustrates needle path for ultrasound guided catheter placement of deep parasternal plane catheter.

Morphine Milligram Equivalents and Average Pain Scores

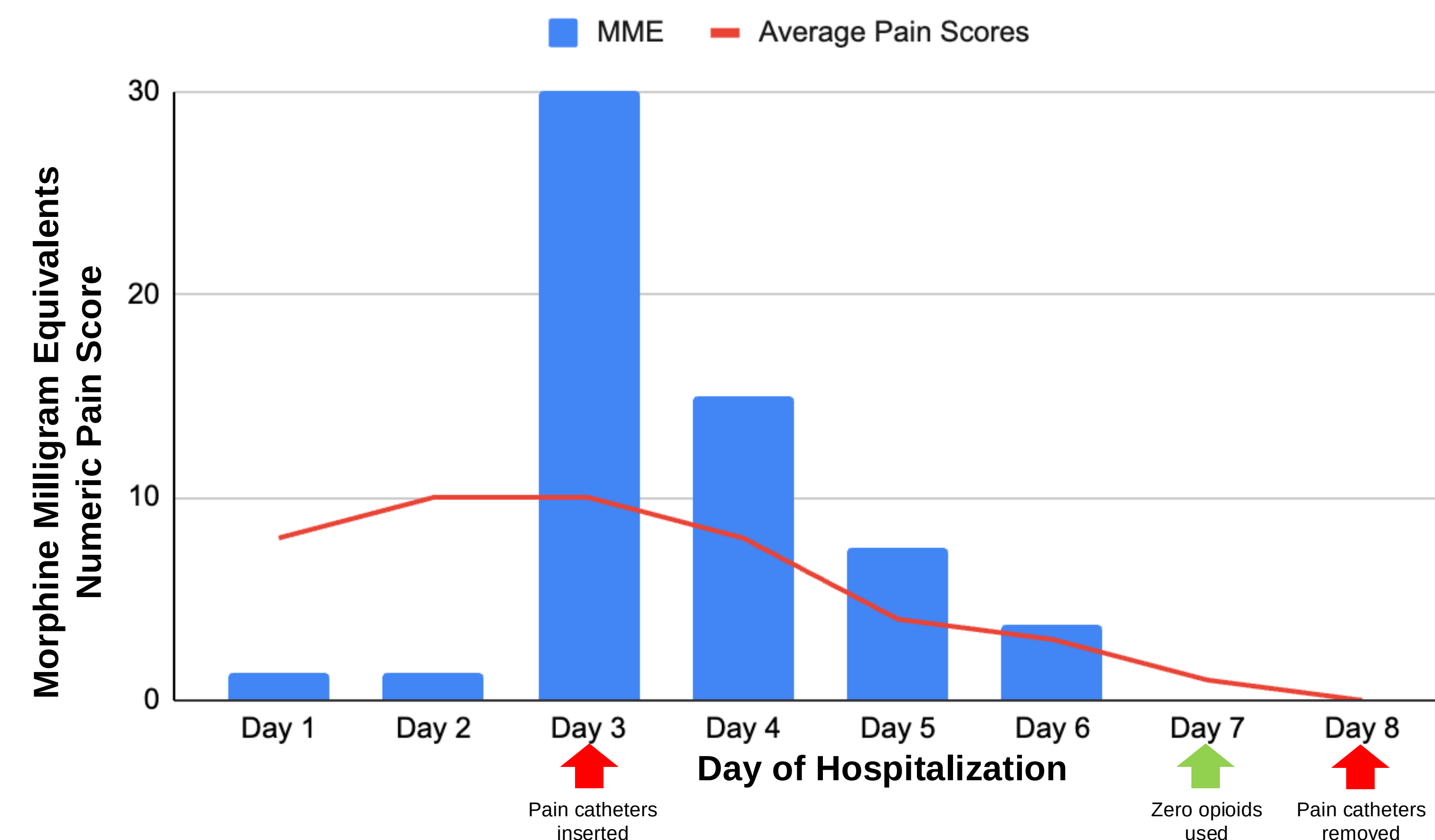


Figure 2. Patient opioid usage in MME throughout hospitalization in relation to average numeric pain score with scale of 0 to 10. Arrows indicate timing of the deep parasternal pain catheter placement and removal, and timing of no further opioid usage.

DISCUSSION

- Treating the severe pain with opioids comes with adverse side effects especially for elderly patients.
- Other regional techniques such as thoracic epidurals and paravertebral blocks require strict timing of venous thromboembolism prophylaxis and is not specific to anterior chest pain.
- This block covers the anterior branches of intercostal nerves T2-T6, which are located between the intercostal muscle and transversus thoracis muscle.
- While this block has been described for pain relief in sternal fracture, continuous pain relief with catheters is novel. This technique is more commonly used in surgical sternotomy for enhanced recovery after cardiac surgery.

CONCLUSION

- Sternal fractures are painful and come with significant pulmonary risk. This case highlights the use of continuous deep parasternal plane block, also known as the transversus thoracic plane block, to provide extended analgesia for sternal fracture.

REFERENCE

1. Thomas KP, Sainudeen S, Jose S, Nadhari MY, Macaire PB. Ultrasound-Guided Parasternal Block Allows Optimal Pain Relief and Ventilation Improvement After a Sternal Fracture. *Pain Ther*. 2016 Jun;5(1):115-22. doi: 10.1007/s40122-016-0050-5. Epub 2016 Mar 21. PMID: 27001634; PMCID: PMC4912971.
2. Francis L, Condrey J, Wolla C, Kelly T, Wolf B, McFadden R, Brown A, Zeigler S, Wilson SH. Parasternal intercostal plane block catheters for cardiac surgery: a retrospective, propensity weighted, cohort study. *Pain Manag*. 2023 Jul;13(7):405-414. doi: 10.2217/pmt-2023-0043. Epub 2023 Aug 24. PMID: 37615072.
3. Renuka George, MD; Kirsten Dahl, MD; Johanna Blair de Haan, MD (2024) *How I do it: Transversus Thoracic Plane Block*, *ASRA Pain Medicine*. Available at: <https://www.asra.com/news-publications/asra-newsletter/newsletter-item/asra-news/2020/06/24/transversus-thoracic-plane-block-how-i-do-it>.