Introduction: Intercostal and thoracic paravertebral blocks constitute regional anesthetic techniques that can be used in children and adults for acute and chronic pain treatment, surgical anesthesia, and postoperative analgesia. This case report represents an example of anesthesiologists’ potential role as diagnosticians, with a unique utilization of regional anesthesia as a diagnostic tool.

Case Description: The patient is a 17 year-old, 62 kilogram female with bone disease of unknown etiology and a 10-day history of exacerbation of chronic left neck and upper back pain. Her past medical history includes levoscoliosis, migraine headaches, myalgias, and healed bilateral first rib fractures. Her medications include etodolac, tizanidine, fentanyl and lidocaine transdermal patches, oxycodone, cyproheptadine, citalopram, and tramadol.

Physical examination demonstrated exquisite tenderness throughout the left upper and lower thoracic paravertebral regions. Chest and shoulder radiographs demonstrated a healed left first rib fracture. Bone scan revealed increased radionucleotide uptake at the left third, fifth, sixth, and ninth ribs.

Prior to consideration of rib resections, the pediatric surgery service consulted the anesthesiologist for assistance in diagnosis of rib pain versus myalgias.

The patient was brought to the operating room, sedated with 2 milligrams of intravenous midazolam and propofol infusion, and placed in the prone position. Fluoroscopy, with the assistance of a pediatric radiologist, was performed to identify the fractured ribs. Intercostal nerve blocks were performed at ribs five, six, and nine using a 23-gauge spinal needle with 5 mL of local anesthetic and contrast agent (30 mL of bupivicaine 0.5%, 20 mL of Omnipaque 300, and epinephrine 5 mcg/mL) at each level. A left-sided thoracic paravertebral block was performed and local anesthetic spread into the T2 and T3 paravertebral space was confirmed with fluoroscopy (see attached pictures).

Her left upper back pain improved significantly from an 8/10 to 2/10 on the Objective Pain scale. Surgical osteotomy of the left third rib was later performed, and at six weeks follow-up she no longer required fentanyl patches or oxycodone for analgesia.

Discussion: This case report represents a diagnostic and surgical challenge where regional anesthesia provided valuable insight that significantly contributed to patient management.

Establishment of an accurate diagnosis required careful selection of appropriate regional anesthetic techniques. Options included one-time epidural injection, continuous epidural, intercostal nerve blocks, and thoracic paravertebral block.

Intercostal nerve blocks and thoracic paravertebral block were felt to be superior choices to an epidural approach due to their more specific, unilateral anesthetic distribution, and greater ease of performance. The bilateral nature and greater dermatomal spread of epidural injection may not have aided in delineating myalgias from rib fracture pain. Second, a thoracic epidural in a sedated chronic back pain patient who is unable to verbalize paresthesias may be controversial. Further, thoracic epidurals are associated with complications such as post-dural puncture headache, spinal cord injury, backache, transient neurologic symptoms, subdural injection, epidural abscess, and epidural hematoma.

Intercostal nerve block has a relatively low incidence of complications, including high serum levels of local anesthetic per volume injected, and pneumothorax.
Finally, at upper thoracic levels, paravertebral block is a more desirable option secondary to technical difficulty with intercostal nerve blocks related to scapular interference. Complications of thoracic paravertebral block include pneumothorax, intravascular injection, and subarachnoid/subdural/epidural injection. The risk of pneumothorax and injection of solution in unintended locations can be minimized by using the skin to paravertebral space depth equation as described by Lonnqvist and Hesser\(^7\). This equation is S-PVS depth (millimeters) = 21.2 + (0.53 x weight in kilograms).

References: