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Journal
A&a Practice, 14(8)

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Publication Date
2020-06-01

DOI
10.1213/XAA.0000000000001245

Peer reviewed

Continuous Paravertebral Nerve Block for Scapula Fracture Analgesia: A Case Report

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A 46-year-old man presented with severe refractory posterior shoulder pain due to a left scapular fracture sustained during a motor vehicle collision. Despite multimodal oral and intravenous analgesics, the patient's pain remained difficult to control. A continuous paravertebral nerve block was performed between the second and third thoracic vertebrae resulting in excellent analgesia of the scapular pain. This case suggests that a continuous thoracic paravertebral block placed between the second and third vertebrae may be considered as part of multimodal analgesia in patients with scapular fractures. (A&A Practice. 2020;14:e01245.)

GLOSSARY

CARE = Case Reports; **EQUATOR** = Enhancing the Quality and Transparency of Health Research; **NRS** = numeric rating scale

The scapula is a triangular bone that provides stability to the shoulder girdle. Scapular fractures are relatively rare, with an incidence ranging from 0.4% to 1% of all fractures and comprising only 3%–5% of fractures of the shoulder girdle. These fractures are usually sustained due to blunt force trauma, most commonly in high-speed motor vehicle collisions or falls from a significant height.[1] The rarity of these fractures is due to both the force required to fracture this bone and its relatively protected location with numerous supporting muscles. The most common fracture pattern is through the scapular body, as in the reported case.[2] Given the significant pain associated with scapular fractures, intravenous opioids are generally required for sufficient pain control.[3]

Regional anesthesia has been shown to reduce both morbidity and mortality in patients with blunt chest trauma.[4] However, there have been few reports of regional anesthetic techniques for analgesia in the setting of scapular fractures, likely due to the rarity of this type of fracture, with both continuous suprascapular nerve and serratus plane techniques having been described for scapular analgesia.[5,6] There are 17 muscles that fix to the scapula with a large contribution from the brachial plexus. The suprascapular and dorsal scapular nerves, which originate from cervical roots 5 and 6, provide innervation to many of these muscles. Yet, there is no literature on the innervation of the scapula bone itself. We report here a case in which a continuous infusion via a thoracic paravertebral catheter between the second and third thoracic vertebrae provided good analgesia following scapular fracture. This article adheres to the applicable Enhancing the Quality and Transparency of Health Research (EQUATOR) guideline and Case Reports (CARE) checklist. The University of California, San Diego, Institutional Review Board (San Diego, CA) waives the review of case reports or small case series. Written consent for publication of nonidentifying medical information and imaging in the form of a case report along with Health Insurance Portability and Accountability Act authorization was obtained from the patient.

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Accepted for publication May 11, 2020.

Funding: None.

Conflicts of Interest: See Disclosures at the end of the article.

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DOI: 10.1213/XAA.0000000000001245

CASE REPORT

A 47-year-old man with no significant medical history presented with a comminuted left scapular body fracture (Figure) sustained in a motorcycle collision. His other injuries included left minimally displaced second through tenth posterior rib fractures; a distal left clavicular fracture; and T6, T8, and T9 vertebral body compression fractures. The patient received a multimodal analgesic regimen including acetaminophen 650 mg every 6 hours, gabapentin 300 mg every 8 hours, transdermal lidocaine patches every 12 hours, and intravenous hydromorphone via a patient-controlled analgesia pump with a 0.3-mg bolus available every 10 minutes. However, despite this regimen, the patient continued to complain of significant pain at the site of the scapula fracture.

The patient was positioned sitting upright on the edge of his hospital bed, and standard American Society of Anesthesiologists monitors were applied. Using a curvilinear probe (8–3 MHz; C35x; Edge-II; SonoSite, Bothell, WA) in a parasagittal orientation, the paravertebral space between the second and third thoracic vertebrae was identified. After preparing the skin on the patient's back with chlorhexidine gluconate and applying a sterile drape, a 17-gauge, 3.5-inch Tuohy needle (Arrow International, Reading, PA) was inserted between the transverse processes of the second and third thoracic vertebrae with an in-plane, parasagittal ultrasound-guided technique. Ten milliliters of 0.5% bupivacaine with 2.5 μg/mL epinephrine was injected with frequent aspiration to avoid intravascular injection. A flexible 19-gauge catheter (Arrow International) was inserted into the second thoracic paravertebral space under direct visualization. After confirming the position of the catheter by injection of 1 mL of the same bupivacaine/epinephrine

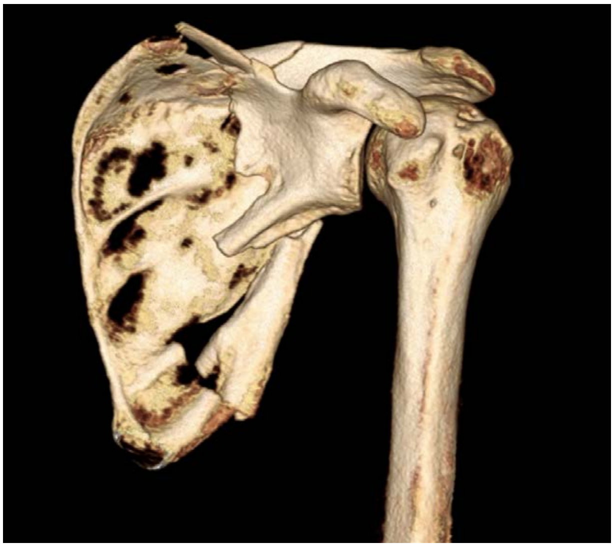

Figure. Helical computed tomography reconstruction from axial, sagittal, and coronal planes using bone window algorithms illustrating a comminuted left scapular body fracture.

mixture and visualizing spread in the paravertebral space, the catheter was secured with 2-octyl cyanoacrylate adhesive and clear occlusive dressings. Catheter placement was confirmed under ultrasound guidance. Ropivacaine 0.2% (12 mL/h basal rate, 4 mL bolus, lockout 30 minutes) was infused via the catheter.

Before the block, the patient reported a pain score of 8 of 10 on a numeric rating scale (NRS) and difficulty with range of motion of his left upper extremity due to pain in the scapula. Twenty minutes after the block, he reported 4 of 10 pain with significant improvement in shoulder range of motion.

The following day the patient continued to report left posterior shoulder pain scores ranging 1 to 4 of 10 on NRS and participated in physical therapy. On the second day after catheter placement, the patient required magnetic resonance imaging of his thoracic spine for surgical planning in regard to his spinal fractures. The paravertebral catheter was therefore removed due to the metallic coils. He experienced a subsequent increase in scapular pain that was controlled with oral and intravenous analgesics.

DISCUSSION

Scapular fractures are infrequent but extremely painful injuries that result from high-velocity impact to the shoulder girdle. Analgesia for these injuries primarily consists of intravenous opioids, because optimal regional anesthetic techniques have not been investigated for scapular fractures. In this case, a continuous thoracic paravertebral nerve block between the second and third thoracic vertebrae provided analgesia for a patient's scapula fracture allowing for a subjective increase in range of motion of the shoulder. Although there is little information in the literature with regard to innervation to the scapula bone, both the brachial plexus and intercostal nerves may contribute to innervation of the surrounding musculature.[7] Reports of successful scapular analgesia provided by suprascapular nerve block and serratus plane block may indicate that the scapula receives innervation from both the cervical and thoracic regions of the spinal cord.[5,6] Additionally, cephalad spread of local anesthetic may also have anesthetized a portion of the brachial plexus in this patient.

Orthopedic surgeons generally recommend simple immobilization until the acute pain has subsided for patients with scapular fractures. Active range-of-motion exercises as early as possible are important for functional outcome,[8] further emphasizing the importance of excellent analgesia. We suggest that a T2 continuous paravertebral nerve block be considered as part of a multimodal analgesic regimen, along with nonsteroidal anti-inflammatory drugs and other nonopioid analgesics for scapular fractures.

While a randomized clinical trial is optimal to provide data on analgesia for scapular fractures, the rarity of these fractures and the fact that they are frequently associated with significant comorbid injuries would impede such an investigation.

DISCLOSURES

Name: Brian P. Curran, MD.
Contribution: This author helped perform the case and write the manuscript.
Conflicts of Interest: None.
Name: Coti R. Phillips, MD.
Contribution: This author helped write and edit the manuscript and was directly involved in the patient's care.
Conflicts of Interest: None.
Name: Matthew W. Swisher, MD, MS.
Contribution: This author helped write and edit the manuscript and was directly involved in the patient's care.
Conflicts of Interest: Matthew W. Swisher's institution has received funding and/or product for his research from Ferrosan Medical Devices, Myoscience, Epimed, and SPR Therapeutics.
Name: John J. Finneran IV, MD.
Contribution: This author helped perform the case and write the manuscript.
Conflicts of Interest: John J. Finneran's institution has received funding and/or product for his research from Ferrosan Medical Devices, Myoscience, Epimed, Infutronix, and SPR Therapeutics.
This manuscript was handled by: BobbieJean Sweitzer, MD, FACP.

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