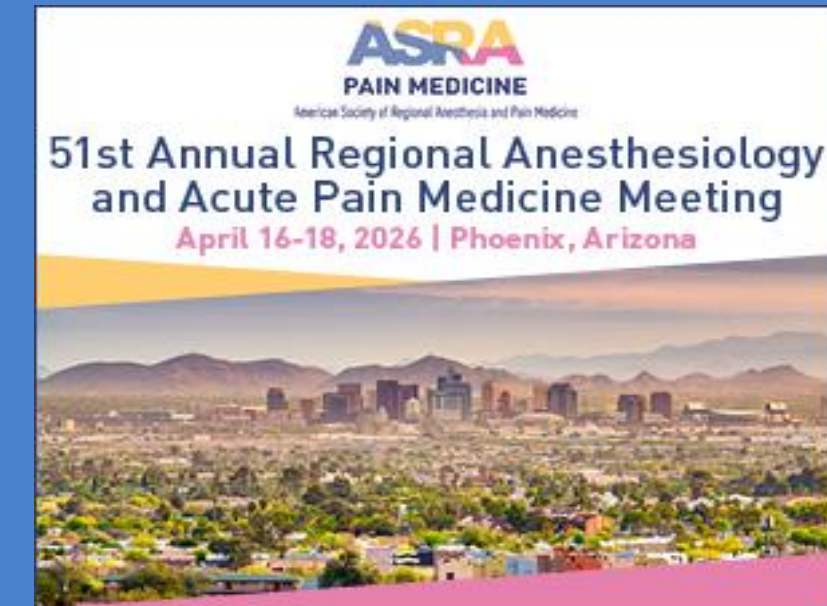


Ultrasound-Guided Clavipectoral Fascial Plane Block for Traumatic Clavicular Fracture

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Introduction

Regional anesthesia blocks, including brachial plexus blocks, are used to provide pain relief for upper extremity surgeries. The clavipectoral fascial plane block (CFPB), utilized specifically for clavicle fracture surgeries and pain management, is an emerging anesthetic technique. CFPB has been used for postoperative pain management, but can also be used as a stand-alone anesthetic technique for clavicle fracture management, with a lower risk of adverse effectsⁱ. The Clavipectoral plane blocks target sensory nerves that traverse the clavipectoral fascia and are particularly advantageous for avoiding the phrenic nerve and upper extremity motor neurons, making this block suitable for patients in whom respiratory function preservation and upper limb mobility are critical. Studies have shown that clavipectoral plane blocks significantly decreased the incidence of hemidiaphragmatic paralysis with significant pulmonary function improvement and no difference in block efficacy when compared to interscalene brachial plexus block with cervical plexus blockⁱⁱ.

Materials and Methods

As the case report is devoid of patient identifiable information, it is exempt from IRB review requirements per University of Illinois College of Medicine IRB's policy.

Case report

We present the case of a 30-year-old male with a past medical history of mild intermittent asthma and a former tobacco smoker who presented for scheduled outpatient open reduction and internal fixation of a closed, displaced right midshaft clavicular fracture due to a motorcycle accident. The patient was referred to UI Hospital from an outside hospital and the initial x-ray of the right clavicle showed a displaced middle third clavicle fracture with overlying soft tissue swelling and mild overriding fragments. Since the accident, the patient has been non-weight-bearing of his right upper extremity. Consequently, he opted for surgical intervention. Given the location of the fracture, in the operating room, the patient was induced with propofol infusion, then an ultrasound-guided right clavipectoral block with cervical plexus block was performed. 15 ml 0.5% Bupivacaine was used for the plane block.

Intraoperatively, the patient received 0.5 mg Hydromorphone and 100 mcg Fentanyl as adjunct pain medications. The surgery was completed without complications. X-ray of the right clavicle postoperatively demonstrated the internal fixation of a nondisplaced spiral fracture of the midclavicular by hardware placement along the superior aspect of the clavicle with fracture fragments aligned. Upon discharge, the patient was prescribed Hydrocodone-Acetaminophen 5-325 mg every 6 hours as needed and referred to physical and occupational therapy.

On postoperative day 3, the patient was evaluated in the Orthopedic Surgery clinic, reporting improved, tolerable pain with no new symptoms or complications. On physical exam, the patient continued to have stiffness of the right shoulder but had a full range of motion of the right shoulder, elbow, and wrist joints. X-ray of the right clavicle demonstrated interval plate and screw fixation of a subacute midclavicular fracture with satisfactory fracture reduction and alignment without evidence of hardware dysfunction.

Images

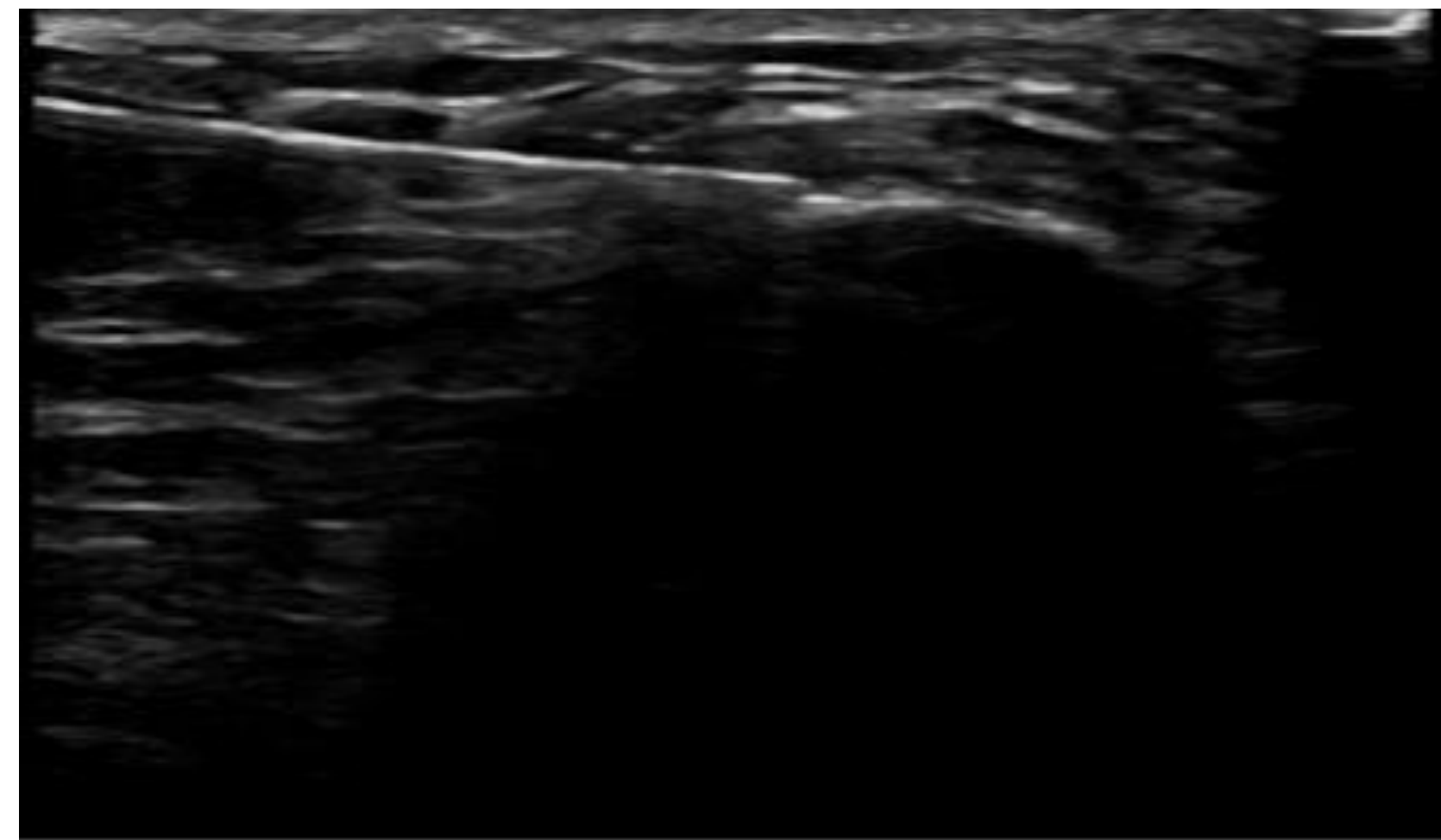


Image 1, 2, 3. In sequence, ultrasound guided approach of CFPB

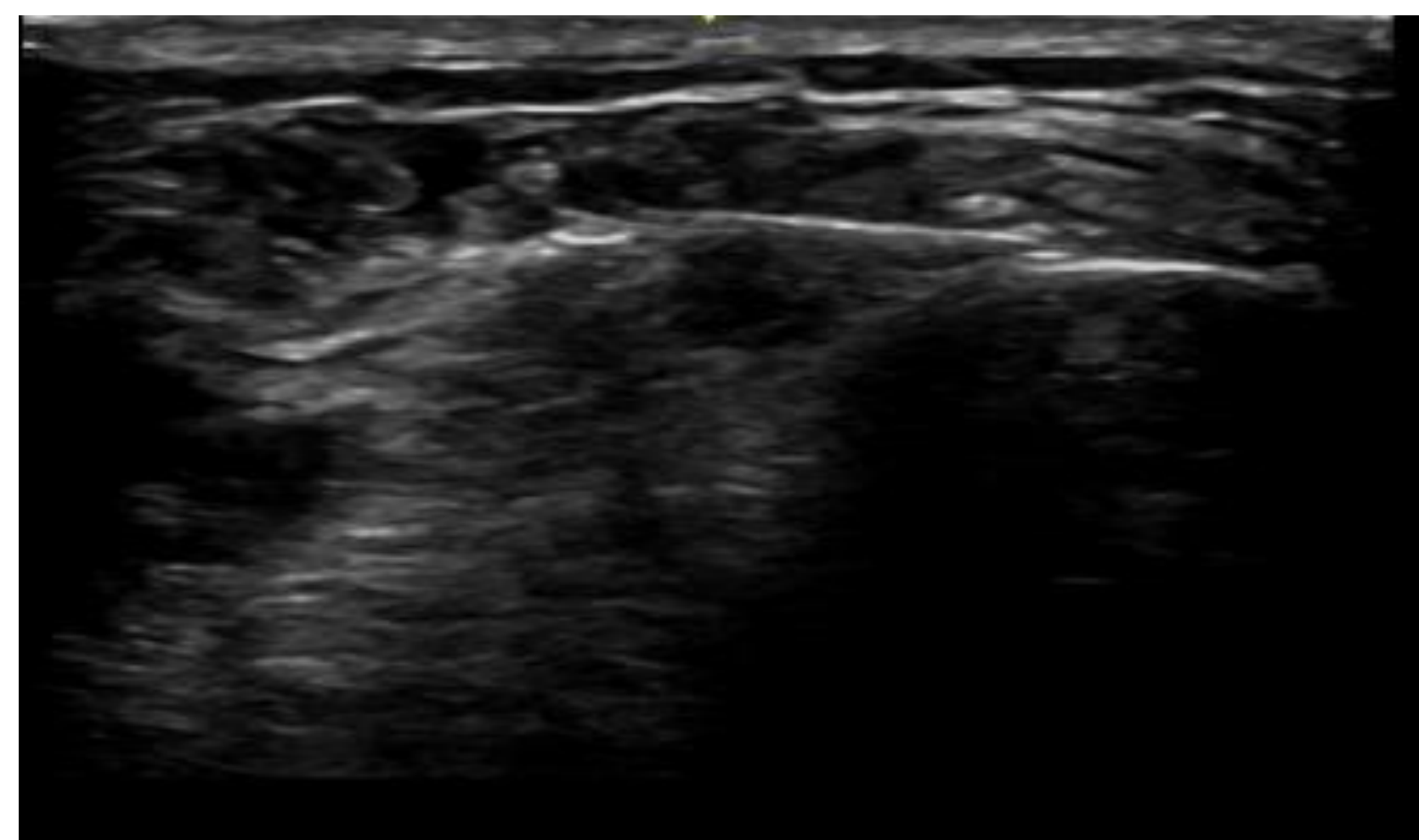


Image 3. Local anesthetic deposition lifting the periosteal fascia

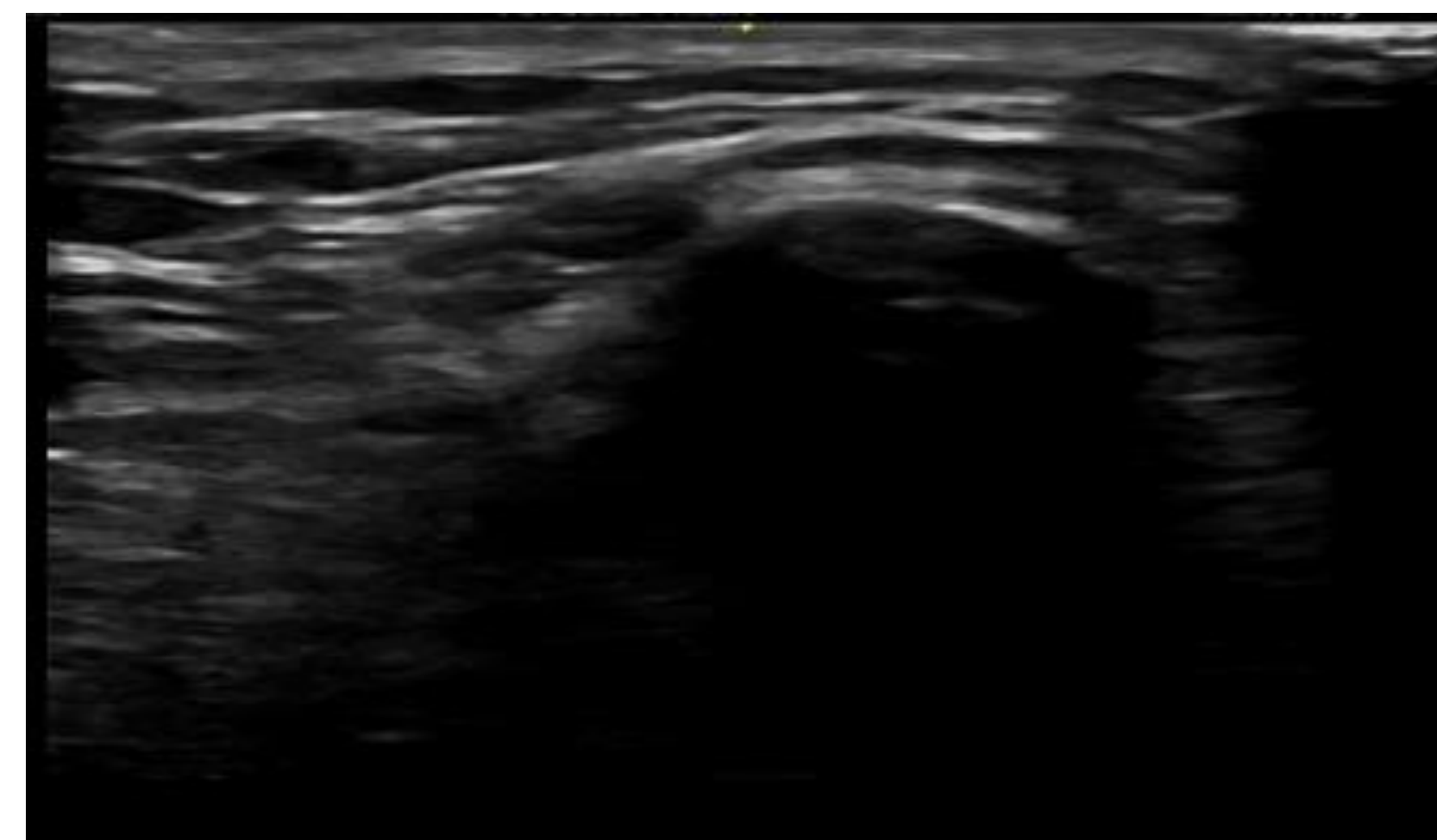


Image 2. Approaching periosteal target

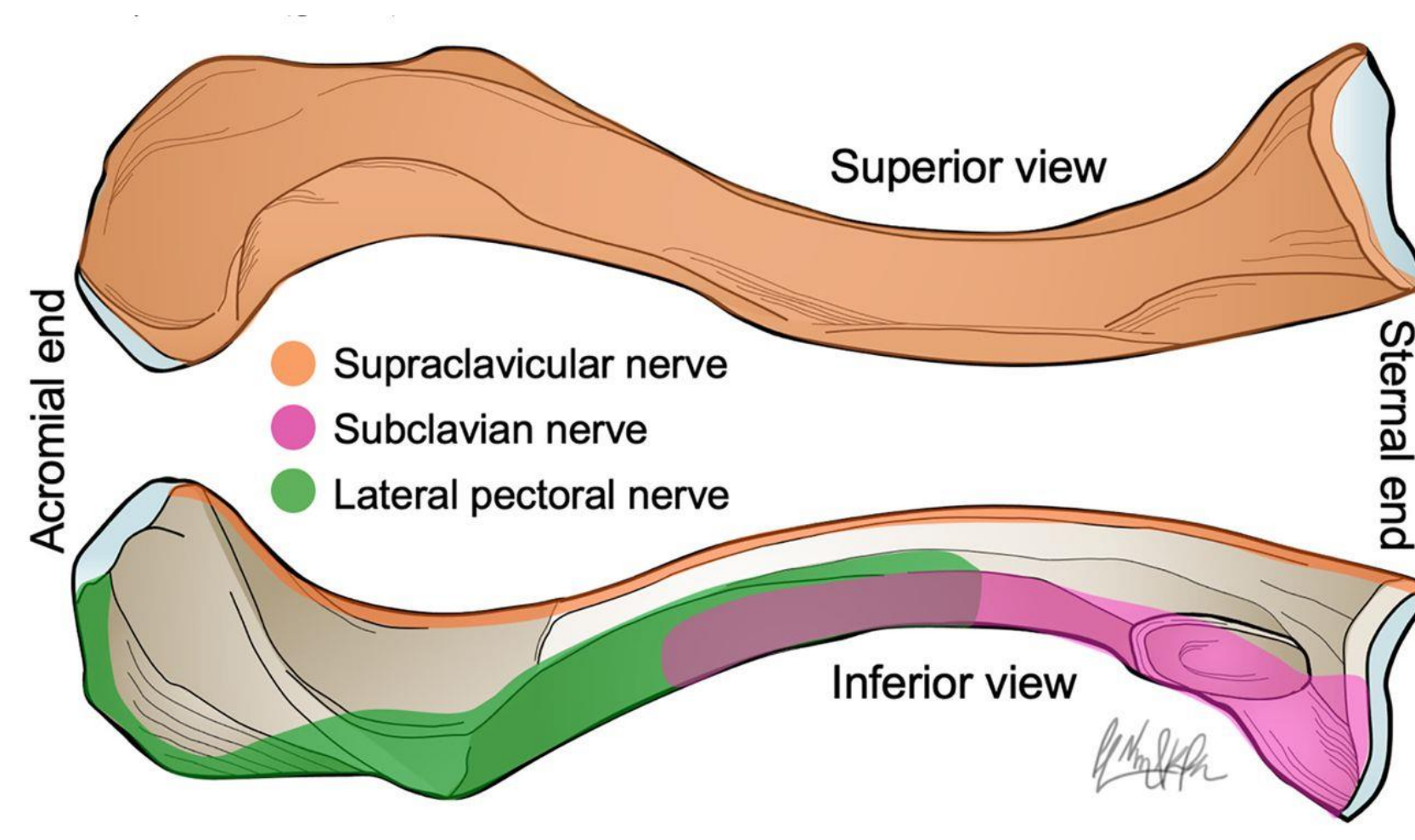


Image 4. Innervation of the clavicle

Case report

Postoperative day 45, the patient reported no pain and was weight-bearing, able to do push-ups. The patient continued to attend physical therapy without issues. On physical exam, the patient had a full range of motion of the right shoulder, elbow, and wrist joints without stiffness and pain. On postoperative day 108, the patient reported no pain and was able to perform physical activity without issue. On examination, the patient was non-tender to palpation at the clavicle, AC joint, and scapula, with a full range of motion without pain or stiffness. X-ray of the clavicle continued to show a stable subacute right midclavicular fracture without evidence of hardware dysfunction.

Conclusion

Although our patient was relatively healthy without comorbid conditions, the clavipectoral plane block minimizes risk for complications while providing significant perioperative pain relief, decreasing the amount of opioid usage. Patients undergoing clavicular surgery with pulmonary function compromise or at risk for phrenic nerve palsy would benefit the most. Even though current evidence does not support the use of clavipectoral blocks for pain relief distal to the clavicle, further research is needed to clarify their role in broader upper-extremity pain relief. The CFPB emerges as a promising, accessible regional anesthesia technique for effectively managing clavicular fractures. With its anatomically targeted approach and simplified surgical steps, this block is a valuable addition to the armamentarium of pain management strategies.

Discussion

Clavicle fractures account for about 2.6% of all fractures but are often encountered in trauma settings where general anesthesia can pose added risk. While regional anesthesia has emerged as a useful tool in trauma, the CFPB is not yet mainstream and remains to be a common method of managing fractures. Providing regional anesthesia to the clavicle via peripheral nerve blocks remains a challenge due to multiple innervations of the clavicle and the requirement of a combination of peripheral nerve blocks like cervical plexus block and brachial plexus block for adequate coverage. This combination can be associated with complications like phrenic nerve palsy and pneumothorax.

The sigmoid shaped clavicle or collarbone itself lies horizontally across the upper chest and protects the tissues and vessels traversing the neck down to the upper extremities. It is articulated medially with the manubrium and laterally by the acromion process of the scapula, playing an essential role in functional movement, and acting as a brace for the shoulder, allowing weight transfer from the upper limb to the axial skeleton. The clavicle is innervated by the spinal accessory nerve (cranial nerve XI), axillary nerve (C5-C6), nerve to subclavius (C5-C6), supraclavicular nerve (C3-C4), and lateral pectoral nerve (C5-C7), portions of both the cervical and brachial plexuses. Multiple innervations of the clavicle make it difficult to choose one single anesthetic block technique for clavicle surgeries.

Historically, interscalene cervical plexus block, superficial cervical plexus block, or their combination was used to cover the clavicle. Due to the increased time consumption required to administer two separate blocks and the adverse effects associated with the brachial plexus blocks, usually general anesthesia becomes the preferred choice for clavicle fixation surgeries. The clavipectoral fascial plane block (CFPB), utilized for clavicle fracture surgeries and pain management is an emerging anesthesia technique. The tough fascial target fills the space between the clavicle and the pectoralis minor muscle and is deep into the clavicular head of the pectoralis major muscle. The advantages of CFPB includes a single injection, safer with the clavicle as the backstop, localized more laterally and superficially without reported adverse events, and has similar analgesic efficacy to the brachial plexus block without increased risk for phrenic nerve palsy. The block may also be beneficial to trauma patients with rib fractures or pneumothorax, which whom general anesthesia with positive pressure ventilation may be contraindicated. Of note, the integrity of the fascia, which can be disrupted in trauma settings, plays an essential role in the efficacy of this plane block. The presence of a significantly displaced or comminuted fracture can disrupt this fascial layer, and lead to the improper spread of the drug. However, inadequate coverage is theoretical and has not been documented as a significant adverse effect. A combination of CFPB and sedation also reduces the cost of administering general anesthesia and airway manipulation during laryngoscopy and intubation.

References

- i. Labandeyra H, Váldes-Vilches LF, Prats-Galino A, Sala-Blanch X. Midclavicle block: An anatomical study. *Eur J Anaesthesiol*. 2025 Feb 1;42(2):122-130. doi: 10.1097/EJA.0000000000002079. Epub 2024 Oct 23. PMID: 39444274.
- ii. Zhuo Q, Zheng Y, Hu Z, Xiong J, Wu Y, Zheng Y, Wang L. Ultrasound-Guided Clavipectoral Fascial Plane Block With Intermediate Cervical Plexus Block for Midshaft Clavicular Surgery: A Prospective Randomized Controlled Trial. *Anesth Analg*. 2022 Sep 1;135(3):633-640. doi: 10.1213/ANE.0000000000005911. Epub 2022 Jan 21. PMID: 35061634.
- iii. Gawel RJ, Kramer JA. Ultrasound-Guided Clavipectoral Plane Block for Analgesia of Acute Clavicular Fracture in the Emergency Department. *J Emerg Med*. 2025 Feb;69:54-57. doi: 10.1016/j.jemermed.2024.08.020. Epub 2024 Sep 4. PMID: 39904642.
- iv. Ashworth H, Martin D, Nagdev A, Lind K. Clavipectoral plane block performed in the emergency department for analgesia after clavicular fractures. *Am J Emerg Med*. 2023 Dec;74:197.e1-197.e3. doi: 10.1016/j.ajem.2023.09.056. Epub 2023 Oct 3. PMID: 37865557.
- v. Labandeyra H, Váldes-Vilches LF, Prats-Galino A, Sala-Blanch X. Midclavicle block: An anatomical study. *Eur J Anaesthesiol*. 2025 Feb 1;42(2):122-130. doi: 10.1097/EJA.0000000000002079. Epub 2024 Oct 23. PMID: 39444274.
- vi. Labandeyra H, Heredia C, Váldes-Vilches LF, Prats-Galino A, Sala-Blanch X. Clavipectoral fascia plane block in midshaft clavicle fractures: A cadaveric study. *J Clin Anesth*. 2024 Sep;96:111469. doi: 10.1016/j.jclina.2024.111469. Epub 2024 Apr 27. PMID: 38678917.