

Clavicle Surgery in a Patient with Respiratory Compromise: A Phrenic-Sparing Approach



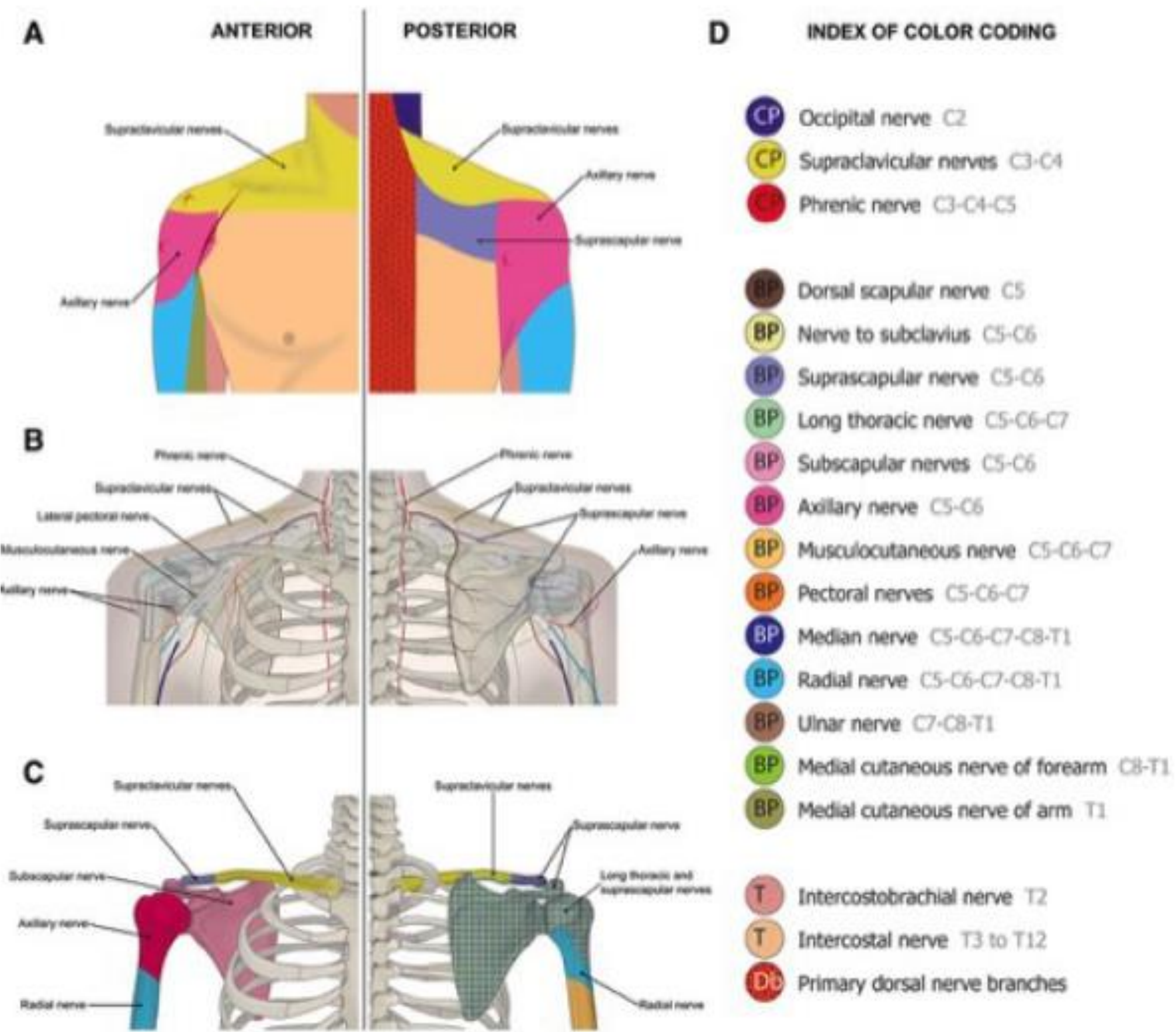
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Background

- The complex innervation of the clavicle presents a challenge to the anesthesiologist hoping to provide sufficient analgesia for clavicle fracture surgery.
- One regional technique used for these cases is the combination of interscalene brachial plexus block and superficial cervical plexus block.
- Oftentimes, an interscalene block is relatively contraindicated due to the predictable motor blockade of the ipsilateral phrenic nerve associated with this approach.
- We present a case of using a combined suprascapular nerve block and superficial cervical plexus block for analgesia following clavicle fracture surgery in a patient with respiratory compromise.



Case Presentation

A 50-year-old male was involved in a motor vehicle collision resulting in the following injuries: bilateral pulmonary contusions, bilateral rib fractures 1-9, right pneumothorax, grade V liver laceration, left tibial plateau fracture, left calcaneus fracture, and left clavicle fracture. He was admitted to the intensive care unit due to respiratory compromise, and a thoracic epidural was placed for rib fracture analgesia. The epidural provided adequate analgesia and was removed on day 5 of admission.

On day 12 of admission, he was scheduled for Open Reduction Internal Fixation (ORIF) of his L clavicle. The surgeon requested an interscalene brachial plexus block as is standard at this institution for ORIF of the clavicle. Due to the high risk of phrenic nerve blockade with this approach, we elected to pursue a combination of phrenic-sparing techniques to provide post-operative analgesia: superficial cervical plexus blockade and suprascapular nerve block.

The suprascapular nerve was visualized under ultrasound beneath the supraspinatus muscle in the suprascapular notch, and 20 milliliters of 0.25% ropivacaine was injected. Then, general anesthesia was induced uneventfully with lidocaine, fentanyl, propofol and rocuronium. Once the patient was intubated, a superficial cervical plexus block was performed by anatomic landmarks (midpoint along the posterior border of the sternocleidomastoid muscle). 15 milliliters of 0.25% ropivacaine was injected. The patient received 100 micrograms of fentanyl during the case (during induction).

In recovery, he reported 0/10 pain. He received no pain medications during his stay in the Post Anesthesia Care Unit. He was discharged to the floor where he received 10 milligrams of oxycodone and reported 0/10 pain until 8 hours after the procedure. His pain at that time was 7/10. His pain was subsequently managed by oral opioids. His oxygen requirements did not change following the procedure, and he remained stable from a respiratory standpoint during the rest of his stay.

Materials and Methods

We obtained informed consent from the patient for submission of this case presentation. This case report contains no patient identifiable information; thus, IRB approval was waived per University of Wisconsin-Madison policy.

Discussion

- Multiple nerves contribute to the innervation of the clavicle including but not limited to the supraclavicular nerve, subclavian nerve, and the lateral pectoral nerve. Historically, a combined brachial plexus block (most often an interscalene block) and superficial cervical plexus block have been used to provide analgesia for clavicle fracture surgeries. This combined approach has even been used as surgical anesthesia for these cases (Ryan and colleagues 2020).
- More recently, novel approaches such as the clavipectoral fascial plane block as well as the selective trunk block have been described. The former approach allows the anesthesiologist to target the terminal branches of many of the nerves described above with less risk of phrenic nerve involvement, whereas the selective trunk block as described by Karmakar and colleagues (2020) still involves a significant risk of phrenic nerve blockade.
- In our patient, who was at risk of respiratory deterioration due to extensive bilateral rib fractures, we elected to pursue a superficial cervical plexus block to target the medial aspect of the clavicle combined with a suprascapular nerve block to target the acromioclavicular joint space, which-depending on the surgical approach to ORIF-can be the target of some manipulation during surgery. This plan for analgesia significantly reduced the risk of phrenic nerve involvement, thus preserving the patient's respiratory mechanics while still providing excellent post-operative analgesia.
- We should note that superficial cervical plexus block does still carry a minor risk of phrenic nerve blockade, so the optimal regional anesthetic technique to use for a patient undergoing surgical clavicle fracture repair must be individualized and take into consideration both the location of injury as well as the patient's own risk factors.

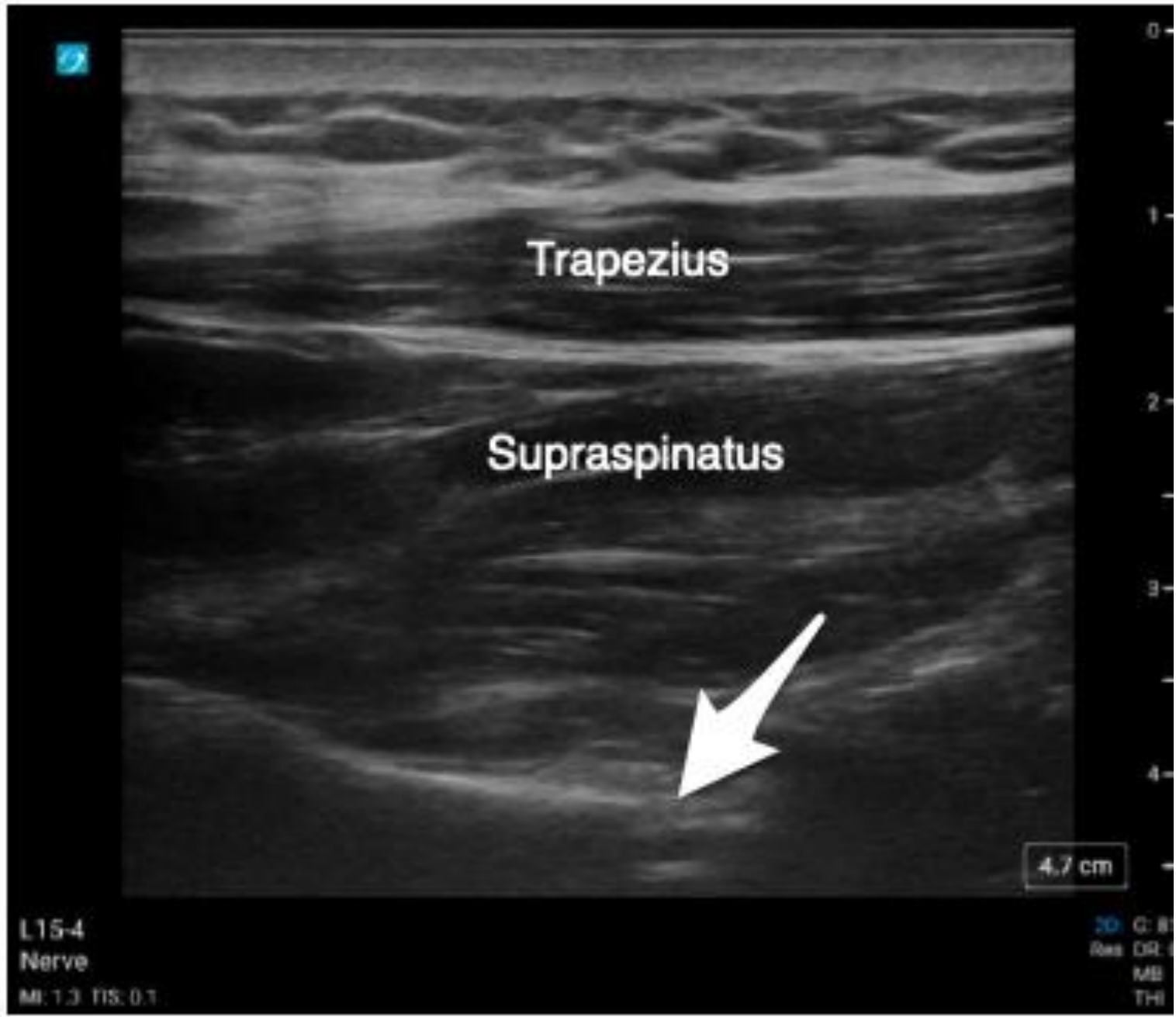


Image courtesy of Dean Weich

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