



Retroclavicular Approach to the Infraclavicular Region Nerve Block in a Patient with an Upper Extremity Burn Injury

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Background

- Patients with burn injuries often experience severe multifactorial pain exacerbated by debridement and frequent dressing changes. Nerve blocks, particularly when burns are localized to specific peripheral nerve or dermatomal distributions, may achieve lower pain scores and reduce opioid analgesic requirements.¹⁻³
- Infraclavicular nerve blocks are highly effective in achieving comprehensive sensory block of the arm. Studies have shown better, or similar, success rates as compared to supraclavicular and axillary blocks.⁴⁻⁵ They are advantageous when placing catheters, as the catheter is stabilized by the pectoralis muscle.⁶
- With the infraclavicular block, local anesthetic is injected at the level of the cords of the brachial plexus, providing analgesia from the mid-arm down but sparing the axilla.



Left upper extremity second degree burns

Case Presentation

A 65-year-old healthy male presented with second degree burns of the left distal forearm and hand as well as additional burns on the left leg.

Acute Pain Service (APS) Consult:

- APS was consulted for inadequate pain control.

- Patient reported severe (10/10) throbbing pain in the medial forearm and dorsal/palmar hand, making burn care and dressing changes intolerable.

- Multimodal regimen of acetaminophen, methocarbamol, celecoxib, morphine, & tramadol along with regional block was recommended.

Peripheral Nerve Catheter:

- An infraclavicular nerve block with peripheral nerve catheter was to be placed but, using a curvilinear probe, several venous structures were found overlaying the proposed needle path.

- A retroclavicular approach was selected instead for improved access to the brachial plexus cords. The patient was started on a 0.2% ropivacaine infusion at a continuous rate of 5mL/hr with adequate pain relief and a demand dose of 2mL/hr for the patient to use prior to dressing changes.

Analgesia:

- Patient reported good pain control in the upper extremity and tolerable dressing changes; however, remained on tramadol and morphine as needed for additional severe pain in the lower extremity, which also had extensive burns.

Regional Anesthetic Considerations

Infraclavicular Nerve Block

- Challenges involved with the typical approach to the infraclavicular block include increased depth of structures requiring an acute angle, need for arm abduction, and unfavorable anatomy with overlying vasculature in the needle path.⁷

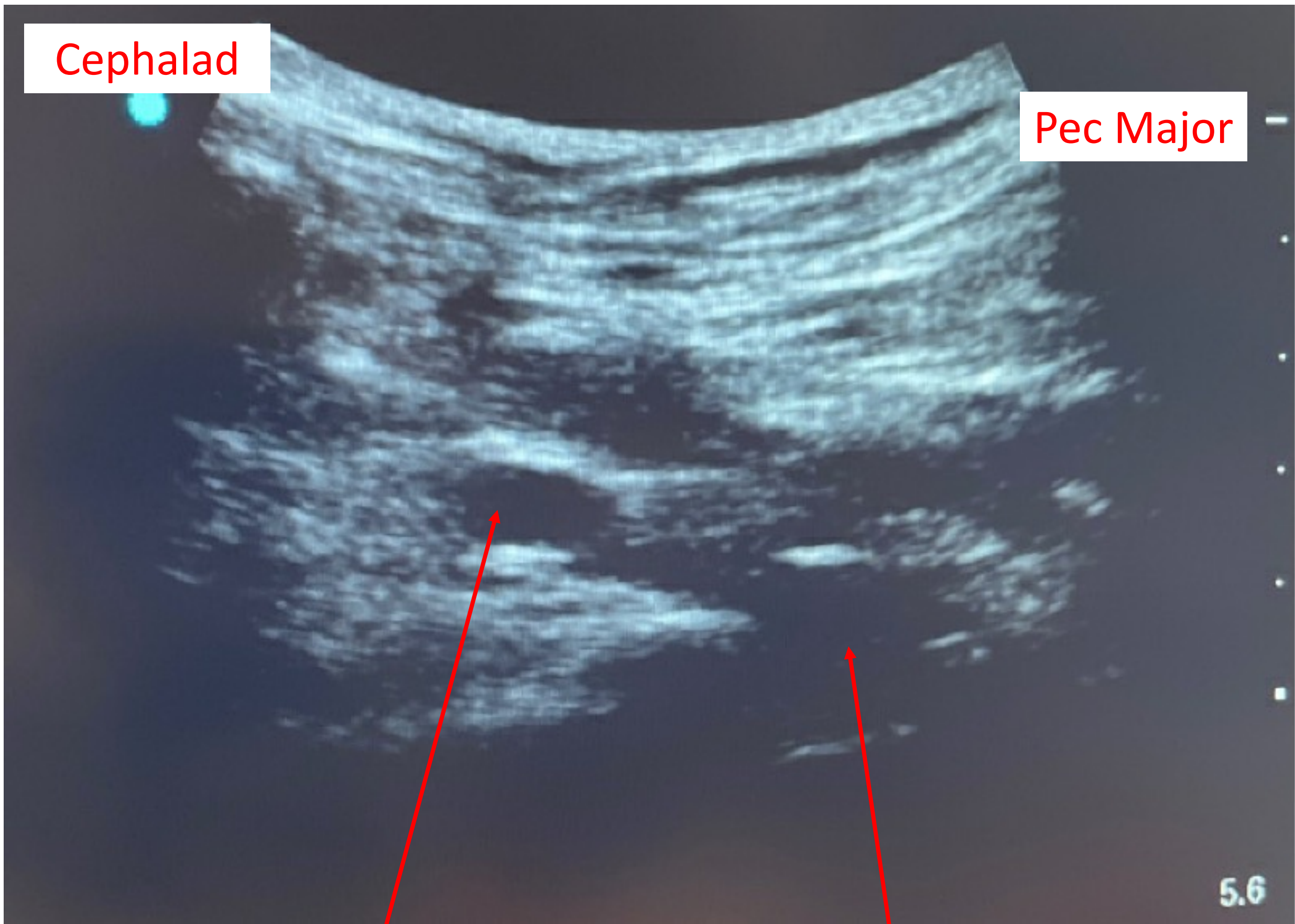
- Rather than the traditional approach, the retroclavicular approach to the infraclavicular nerve block can be utilized. By passing underneath the clavicle, the needle is passing parallel to the probe resulting in better visualization of the path and avoidance of venous structures.⁸

Efficacy for Burn Injuries

- Patients with burn injuries can experience benefit from regional anesthetic techniques in the acute setting given the severity of pain, need for repeat wound debridement or dressing changes, and multifactorial etiology that may aggravate underlying chronic pain.⁹

- Placing a peripheral nerve catheter allows for bolus dose analgesia prior to burn care for added coverage.¹⁰

- It is important to note the injection site for peripheral nerve catheter placement should be intact without burn injury and care should be taken to prevent infection at the site.



Axillary Artery Axillary Vein

Anatomy of the retroclavicular approach to infraclavicular nerve block

Conclusions

- Insertion of a peripheral nerve catheter with a continuous infusion and demand dose may be beneficial for patients who have experienced extensive burn injuries following dermatomal distributions.
- The infraclavicular nerve block offers blockade of the upper extremity by depositing local anesthetic around the axillary artery at the level of the brachial plexus cords. If the proposed path contains overlying venous structures, a retroclavicular approach can be utilized.

References

¹Town, C. J., Johnson, J., Van Zundert, A., & Strand, H. (2019). Exploring the Role of Regional Anesthesia in the Treatment of the Burn-Injured Patient: A Narrative Review of Current Literature. *The Clinical Journal of Pain*, 35(4), 368-374.

²Gordis, T., Horter, J., Vogelzang, J., et al. Enzymatic debridement for the treatment of severely burned upper extremities – early single center experiences. *BMC Dermatol* 16, 8 (2016).

³Sheckter CC, Stewart BT, Barnes C, Walters A, Bhalla PI, Pham TN. Techniques and strategies for regional anesthesia in acute burn care-a narrative review. *Burns Trauma*. 2021;9.

⁴Kaye, A. D., Allampalli, V., Fisher, P., Kaye, A. J., Tran, A., Cornett, E. M., Imani, F., Edinoff, A. N., Djalali Mottagh, S., & Urman, R. D. (2021). Supraclavicular vs. Infraclavicular Brachial Plexus Nerve Blocks Clinical, Pharmacological, and Anatomical Considerations. *Anesthesiology and pain medicine*, 11(5), e120658. <https://doi.org/10.5812/aapm.120658>

⁵Tran, D. Q., Russo, G., Muñoz, L., Zazouli, C., & Finlayson, R. J. (2020). A prospective, randomized comparison between ultrasound-guided supraclavicular, infraclavicular, and axillary brachial plexus blocks. *Regional anesthesia and pain medicine*, 34(4), 368-371. <https://doi.org/10.1097/AAP.0b013e318ac7d18>

⁶Atchabedian A, Vandepitte C, Lopez AM. Ultrasound-Guided Infraclavicular Brachial Plexus Nerve Block. *NYSORA*. Available from: www.nysora.com/ultrasound-guided-infraclavicular-brachial-plexus-block/

⁷Sinha C, Kumar A, Singh AK, Bhadani UK. Retroclavicular approach of brachial plexus block: Here to stay!! *Saudi J Anaesth*. 2017;11(4):519-520. doi:10.4103/sja.SJA_355_17.4.

⁸Bailey J, Uppal V. Curb Your Enthusiasm: The RAPTR Could Bite. *ASRA Pain Medicine News*. 2020. Available from: <https://www.asra.com/news-publications/asra-newsletter/newsletter-item/asra-news/2020/05/02/curb-your-enthusiasm-the-raptr-could-bite>

⁹Mendoza A, Santoyo FL, Agullo A, et al. The management of pain associated with wound care in severe burn patients in Spain. *Int J Burns Trauma*. 2016;6(1):1-10. PMID: 27069760

¹⁰Town CJ, Strand H, Johnson J, Van Zundert A. Ultrasound-Guided Axillary Brachial Plexus Block for the Management of Graft Site Pain During Dressing Change in the Burn-Injured Patient: A Randomized Control Trial [published correction appears in *J Burn Care Res*. 2022 Oct 15;]. *J Burn Care Res*. 2023;44(11):53-57. doi:10.1093/jbcr/rac060

