

NCBI Bookshelf. A service of the National Library of Medicine, National Institutes of Health.

StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2018 Jan-.

Nerve Block, Ulnar

Authors

John M. Pester¹; Matthew Varacallo².

Affiliations

¹ St. Luke's University Health Network

² Department of Orthopaedic Surgery, University of Kentucky School of Medicine

Last Update: October 27, 2018.

Introduction

An ultrasound-guided ulnar nerve block can be used to provide surgical anesthesia or analgesia to the ulnar portion of the hand including the little finger and the ulnar half of the ring finger. It is primarily used for surgical procedures in the distribution of the ulnar nerve both as a standalone block, combined with ulnar or radial nerve blocks for a complete hand block, or as a rescue method for inadequate brachial plexus blocks. An ulnar nerve block can be used as an alternative to sedation for painful procedures such as fracture reduction, and as a powerful adjunct for acute pain caused by burns. In patients that have sustained multiple lacerations needing repair, regional methods can be used to limit the total amount of local anesthetic used while obtaining surgical anesthesia to the affected area.

Anatomy

The ulnar nerve is a terminal branch of the brachial plexus, comprised of fibers from the medial cord (C8-T1). The nerve courses along the medial side of the humerus and after traversing through the arcade of struthers, the nerve continues posteriorly as it pierces the medial intermuscular septum in the upper arm. The nerve continues into the cubital tunnel at the posteromedial elbow, running between the olecranon process and medial epicondyle. Distal to the elbow, the ulnar nerve passes between the ulnar and humeral heads of flexor carpi ulnaris muscle to enter the flexor compartment of the forearm. Typically, it is found deep to flexor carpi ulnaris, and lateral to flexor digitorum profundus. Distally at the wrist, the ulnar nerve courses superficial to the flexor retinaculum before entering the palm of the hand via Guyon's canal [1].

Although the nerve can be blocked at any point in the upper arm or in the forearm, there are more reliable and reproducible techniques and locations for nerve blockade that have been studied and reported in the literature.

Historically, the literature advocated for either the volar or ulnar approach for ulnar nerve block [2].

Volar approach

The location for ulnar nerve blockade in the volar technique is between the FCU and distal ulna. The FCU is palpated near its insertion at the pisiform, and the needle is inserted just lateral to the FCU tendon and proximal to the wrist crease. Although this is one of the more popular approaches utilized, recent cadaveric studies have continued to report relatively high (up to 50%) rates of intra-arterial puncture or placement of the anesthetic [3][1]

Ulnar/Medial approach

Compared to the volar approach, the needle is inserted posterior (as opposed to lateral/radial) to the FCU tendon. As in the volar approach, the location is just proximal to the wrist crease. Recent studies comparing the two approaches described in this review have cited no cases of intra-articular penetration or placement of anesthetic in the ulnar artery with the ulnar approach (as opposed to up to 50% rate in the volar approach).

Other considerations

Ulnar nerve block at the level of the cubital tunnel is not recommended, as this has been documented to result in compression neuropathy with persistent paresthesia/dysesthesia.

Indications

In general, ulnar nerve block is best suited for procedures not requiring a tourniquet and procedures expected to last under 20 minutes. These include, but are not limited to, the following:

- Surgery of the little finger or fifth metacarpal
- Reduction of fifth metacarpal fractures or MCP dislocation
- Repair of multiple lacerations of the ulnar aspect of the hand and little fingers
- Analgesia for burns to the hand
- Rescue analgesia or anesthesia for failed/inadequate brachial plexus block
- Supplemental block to median nerve block either for procedures involving the ring finger or for incomplete block due to anastomoses

Contraindications

Contraindications to the nerve block include:

- Patient refusal
- Cellulitis or abscess over the injection site
- Local anesthetic allergy
- High-energy injury with concern for acute compartment syndrome (controversial)
- Patient has already received near-toxic threshold dose of local anesthetics and is at risk of local anesthetic systemic toxicity (LAST).

Equipment

For an ultrasound-guided ulnar nerve block you will need the following:

- Local anesthetic: 3 mL to 5mL bupivacaine 0.5% or ropivacaine 0.5% for longer acting blocks, 3 mL to 5 mL lidocaine 2% or mepivacaine 1.5% for shorter acting blocks
- Ultrasound machine with high frequency (greater than 8 MHz) linear probe
- Sterile gel
- Short bevel block needle
- 10 mL syringe
- Skin cleansing agents such as a povidone-iodine solution or chlorhexidine 2%.

Personnel

Personnel trained in ultrasound-guided regional anesthesia and support staff to administer rescue medications if necessary.

Preparation

Obtain informed consent from the patient. Position the patient so that the volar aspect of the affected arm is easily accessible. This can be done with the forearm and hand supinated while resting on a flat surface, or with the arm flexed to 90 degrees at the elbow with the forearm pronated and rested upright against a stack of towels. The latter position allows the clinician to stabilize his/her arm on top of the stack of towels while holding the ultrasound probe. Once positioned, cleanse the skin over the intended injection site with povidone-iodine or chlorhexidine 2%. Apply a sterile probe cover to a high-frequency linear ultrasound probe, then apply sterile gel to the surface. Draw up your preferred local anesthetic into a syringe. Ensure that the patient is appropriately monitored and that there is access to intralipid 20% if needed for severe symptoms due to local anesthetic systemic toxicity.

Technique

The procedure is performed in the following steps:

1. Place the ultrasound probe in a horizontal orientation over the medial aspect of the forearm just distal to the medial epicondyle
2. The ulnar nerve should easily be identified as a white honeycomb-like structure deep to flexor carpi ulnaris
3. Follow the ulnar nerve distally, about 3 cm to 4 cm away from the cubital tunnel
4. Insert the block needle in-plane from lateral to medial, making sure to visualize the needle tip at all times
5. Advance the needle tip just deep to the ulnar nerve
6. Confirm that the tip is not in a vascular space by negative aspiration
7. Inject 1 mL to 2 mL of local anesthetic, adjusting needle tip placement as needed
8. Repeat steps six and seven until an adequate spread of local anesthesia around the nerve has been attained.

Be sure to avoid intraneural injection. If the needle tip appears to be within the nerve or if the patient complains of severe pain upon injection, stop the injection and retract the needle.

Complications

Complications include:

- Infection
- Bleeding at puncture site
- Intramuscular hematoma
- Vascular puncture
- Vascular injection
- Nerve injury including neuropraxia or neurolysis
- Local anesthetic systemic toxicity (LAST)
- Allergic reaction to local anesthetic

Clinical Significance

The widespread use of ultrasound has made regional anesthetic techniques more accessible, safer, and more effective than other methods. Compared with blind or nerve stimulator guided blocks, ultrasound-guided blocks typically have a higher success rate, use less local anesthetic volume, and have fewer complications. An ulnar nerve block can easily and rapidly be performed in a variety of settings to safely provide surgical anesthesia for injuries to the ulnar aspect of

the hand, fifth metacarpal, or little finger. An ulnar nerve block is an excellent option for reduction of the fifth metacarpal (Boxer's) fracture and may provide better anesthesia than a hematoma block. Occasionally, blockade of the ulnar nerve or the median nerve in the forearm does not result in surgical anesthesia. An incomplete block of a terminal branch is likely due to neural anastomoses, which are common and highly variable. The median-ulnar nerve anastomoses described are the Martin-Gruber anastomosis, Marinacci anastomosis, Rich-Cannieu anastomosis, Kaplan anastomosis, and Berrettini anastomosis. Knowledge of these individual anastomoses is not as important as knowing that they exist. If an ulnar nerve block is incomplete, consideration should be given to placement of a median nerve block to account for the anastomosis. Likewise, if a median nerve block fails, an ulnar nerve block should be considered. Sometimes the anastomosis is rather proximal, in which case the block may need to be placed above the elbow.

Enhancing Healthcare Team Outcomes

An ulnar nerve block is usually done by an anesthesiologist, but outside of the operating room, it may also be done by the hand surgeon, plastic surgeon, and orthopedic surgeon. Once the procedure is completed, the monitoring of the patient is done by a nurse. The nurse will monitor the patient for pain, paresthesias, capillary refill, hand warmth, and pulse oximetry. The nurse will also monitor for the immediate complications of the procedure that include a hematoma, bleeding at the puncture site and paresthesias. (Level V)

Outcomes

The most series report that ulnar block is a useful technique when dealing with hand and finger lacerations. The amount of local anesthetic required is much less than that required after a brachial plexus block. Further, the rate of complications is low. For short procedures less than 2-3 hours, an ulnar nerve block is a useful method of managing lacerations both in the emergency and operating room. Complications do occur after an ulnar nerve block, but the rates are less than 1-3%. One of the most common complications is the failure to obtain a satisfactory block of the ulnar nerve. [4][5](Level V)

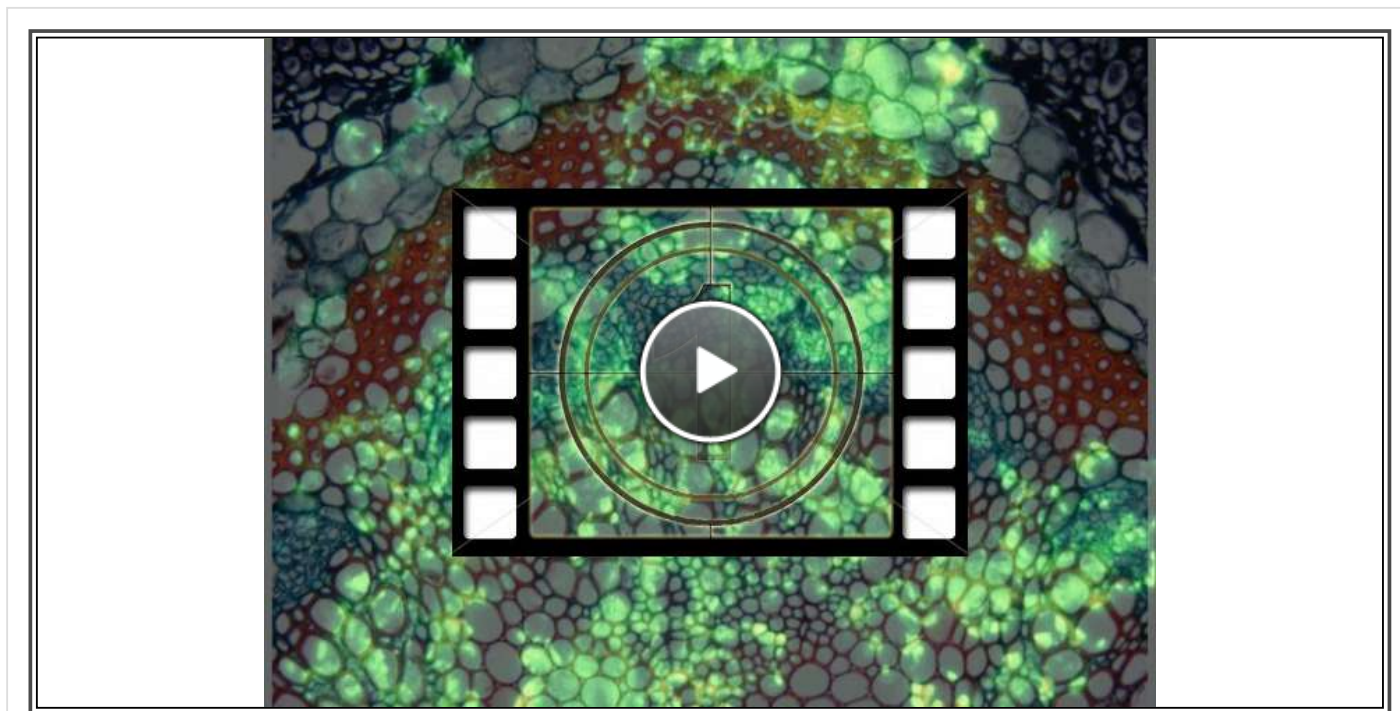
Questions

To access free multiple choice questions on this topic, [click here](#).

References

1. Varshney R, Sharma N, Malik S, Malik S. A cadaveric study comparing the three approaches for ulnar nerve block at wrist. *Saudi J Anaesth*. 2014 Nov;8(Suppl 1):S25-8. [PMC free article: [PMC4268523](#)] [PubMed: [25538516](#)]
2. Lerversee JH, Bergman JJ. Wrist and digital nerve blocks. *J Fam Pract*. 1981 Sep;13(3):415-21. [PubMed: [7276851](#)]
3. Prithishkumar IJ, Joy P, Satyanandan C. Comparison of the volar and medial approach in peripheral block of ulnar nerve at the wrist - a cadaveric study. *J Clin Diagn Res*. 2014 Nov;8(11):AC01-4. [PMC free article: [PMC4290218](#)] [PubMed: [25584201](#)]
4. Gálvez-Múgica MA, Santos-Ampuero MA, Novalbos J, Gallego Sandín S, Galiano A, Gilsanz F, García AG, Abad-Santos F. Ulnar nerve block induced by the new local anesthetic IQB-9302 in healthy volunteers: a comparison with bupivacaine. *Anesth. Analg*. 2001 Nov;93(5):1316-20. [PubMed: [11682422](#)]
5. Dhir S, Brown B, Mack P, Bureau Y, Yu J, Ross D. Infraclavicular and supraclavicular approaches to brachial plexus for ambulatory elbow surgery: A randomized controlled observer-blinded trial. *J Clin Anesth*. 2018 Aug;48:67-72. [PubMed: [29778971](#)]

Figures



[Download video file.](#) (1.8M, mp4)

Ultrasound guided ulnar nerve block, In-plane approach at the mid forearm. Contributed by John Pester, DO

Copyright © 2018, StatPearls Publishing LLC.

This book is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits use, duplication, adaptation, distribution, and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, a link is provided to the Creative Commons license, and any changes made are indicated.

Bookshelf ID: NBK459208 PMID: [29083721](#)