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Emergency Department Clinical Guidelines

CCT/ED Regional Anesthesia/Peripheral Nerve Block Guidelines

Clinical Context and Purpose
To serve as a guideline for the use of regional anesthesia/peripheral nerve blocks in the emergency department.

Background
Pain, specifically acute traumatic pain, is a common reason that patients present to the ED with. Treating pain is a basic humanistic responsibility of ED providers. Furthermore, undertreatment of pain is associated with negative physiologic and clinical consequences; acutely, undertreatment of pain may lead to delirium, hyperglycemia, immunosuppression, hypercoagulability, thus increasing morbidity and mortality. Chronically, undertreatment may lead to chronic pain syndromes and PTSD.[1] Of the various modalities available to the ED provider for the treatment of acute pain, nerve blocks can be utilized as a core component of multimodal analgesia thus reducing the need for parenteral systemic analgesia, opiates, and potentially obviate the need for procedural sedation. As such, in 2021 the American College of Emergency Physicians identified nerve blocks as a core skill for emergency medicine physicians. [2] **What Medication?** The choice of anesthetic may depend on a range of factors, including the indication, patient characteristics, and availability. For example, for procedural regional anesthesia for an incision and drainage or laceration repair, shorter acting agents (e.g. lidocaine) may be preferred. Likewise, longer duration agents (e.g bupivacaine) may be preferred for situations calling for continued analgesia, such as fractures. **What Dose?** Before performing a nerve block, the provider should know the safe weight-based dose to prevent systemic toxicity. **What is Local Anesthetic Systemic toxicity?** Local Anesthetic Systemic Toxicity (LAST) is the most feared complication of regional anesthesia, most commonly due to accidental intravascular injection of bupivacaine. However, the incidence of LAST may be decreasing with the increasing use of ultrasound guidance. [3] LAST can present with a spectrum of symptoms, starting with tongue numbness at low concentrations, ranging to seizures and cardiac arrest at higher concentrations of local anesthetic [4]. Treatment is largely supportive. Lipid emulsion is indicated with severe complications of LAST including seizure and cardiac arrest. The local poison control center and/or toxicologist should be contacted in all cases of suspected LAST (NYC poison control 800-222-1222). http://lipidrescue.org/ is a resource which may aid in suspected cases of LAST.

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How to Document?

Important components to document include: indication, location/nerve block type, preparation, nerve block needle, use of ultrasound guidance, anesthetic choice, outcome, and any complications (paresthesia). Additionally, document a pre/post neurovascular exam, and whether or not the patient was maintained on continuous cardiac and pulmonary monitoring (important in large-volume plane blocks and proximal extremity blocks). [1]

How do I Perform a Block?

Like any procedure, peripheral nerve blocks require preparation. Before performing any block, make sure you have properly prepared including collecting supplies and performing a pre-procedure neurovascular exam. Review the indications, Anatomic/Ultrasonographic landmarks to ensure the nerve block is appropriate and feasible. Communicate your plan to perform a block with consulting services (orthopedics, trauma, anesthesia) when needed.

Guideline

General Contraindications (see Fascia Iliaca Block Guidelines):

1. Patient refusal
2. Known true allergy or previous anaphylactic reaction to local anesthetic
3. Inflammation or infection over injection site
4. Anticoagulation; INR>1.5 or other antiplatelet/anticoagulation medication, relative contraindication-warranting discussion between ED provider and consultant
5. Pre-existing neural deficit in the distribution of the nerve block
6. Hepatic disease- relative contraindication- warranting discussion between ED provider and consultant when relevant

Requirements for performing procedure:

1. Informed consent from patient or health-care proxy
2. Documented, detailed neurovascular exam, including extremity compartment assessments
3. When relevant discuss with the consulting and/or admitting team to discuss appropriateness of block as deemed necessary

General Preparation:

1. Confirm indication, site, and correct patient
2. Rule out contraindication
3. Obtain informed consent
4. Ensure appropriate assistance, monitoring, equipment

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Equipment & Monitoring:

1. Ultrasound with linear transducer
2. Sterile sleeve and sterile gel
3. Chloraprep or antiseptic cleaning supplies
4. Connection tubing (e.g. 3 inch tubing)
5. Two-20 mL syringe
6. 18G needle (for drawing up anesthetic)
7. 25G needle (for skin wheel)
8. normal saline (for flushing connection tubing)
9. Local anesthetic (dose and anesthetic choice depends on procedure being performed. E.g. for fascia iliaca compartment block consider 20-40mL of bupivacaine 0.25%
10. 2-4 cc 1% lidocaine with or without epinephrine (for skin wheel)
11. Cardiac Monitoring with continuous pulse oximetry. Large-volume plane blocks are the highest risk for LAST; when performing these blocks consider continuous cardiac and blood pressure monitoring during and after performance of the block.

Top row (left to right): probe cover, 18G 3 inch nerve block needle, 3 inch connection tubing, 2x 20 cc syringe
Bottom row (left to right): chloraprep, 18G needle, 25G needle, normal saline syringe

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General Nerve Block steps:

1. Place the patient in the appropriate position and expose the target area.
2. Identify appropriate landmarks by utilizing linear ultrasound transducer.
3. Place sterile gloves, and with the help of an assistant, apply a sterile probe cover to the ultrasound probe.
4. Clean the area using an antiseptic solution in the usual sterile fashion and place small sterile drapes.
5. Again, identify appropriate landmarks with ultrasound.
6. Place a small amount (2-4 mL) of 1% lidocaine using a small needle (25G or 30G) to form a skin wheel at the target area of needle insertion.
7. Insert the needle in the previously created skin wheel in an in-plane technique. The needle tip should be in constant view under dynamic ultrasound guidance. If performing nerve block, care should be taken not to inject directly into the nerve but just adjacent to it, to avoid nerve injury.
8. A test injection with 2-4 mL of saline may be used to confirm correct placement. For compartment blocks, hydrodissection of the fascial plane will be achieved with correct needle placement.
9. After negative aspiration, slowly inject appropriate local anesthetic, with periodic aspiration, maintaining needle position throughout.
10. During the procedure, the clinician should frequently evaluate the cardiac monitor (when cardiac monitoring is used) for any signs of ectopy. If any ectopy is noted, the injection should immediately cease. Additionally, the clinician may ask the patient about any symptoms of local anesthetic toxicity (LAST) such as lightheadedness, dizziness, perioral numbness or tingling. This assessment should repeat at the end of the procedure. If any signs of LAST are observed, help should be requested and Intralipid should be considered for refractory toxicity (see below.)
11. Withdraw the needle at the end of the procedure and apply pressure to the area for up to two minutes.
12. Following the procedure, a repeat neurovascular exam should be documented even if the procedure is not completed. The clinician should note the time of the block in their procedure note.
13. Ensure the patient is comfortable and that observations are checked: the patient should remain on a cardiac monitor for at least 30 minutes when cardiac monitoring is employed (see Fascia iliaca block guidelines for that specific block). [6] Healthcare providers should monitor for signs of cardiovascular complications such as dysrhythmias, chest pain and/or shortness of breath; anaphylaxis; central nervous system complications such as seizures, lethargy, or changes in mental status during these checks.

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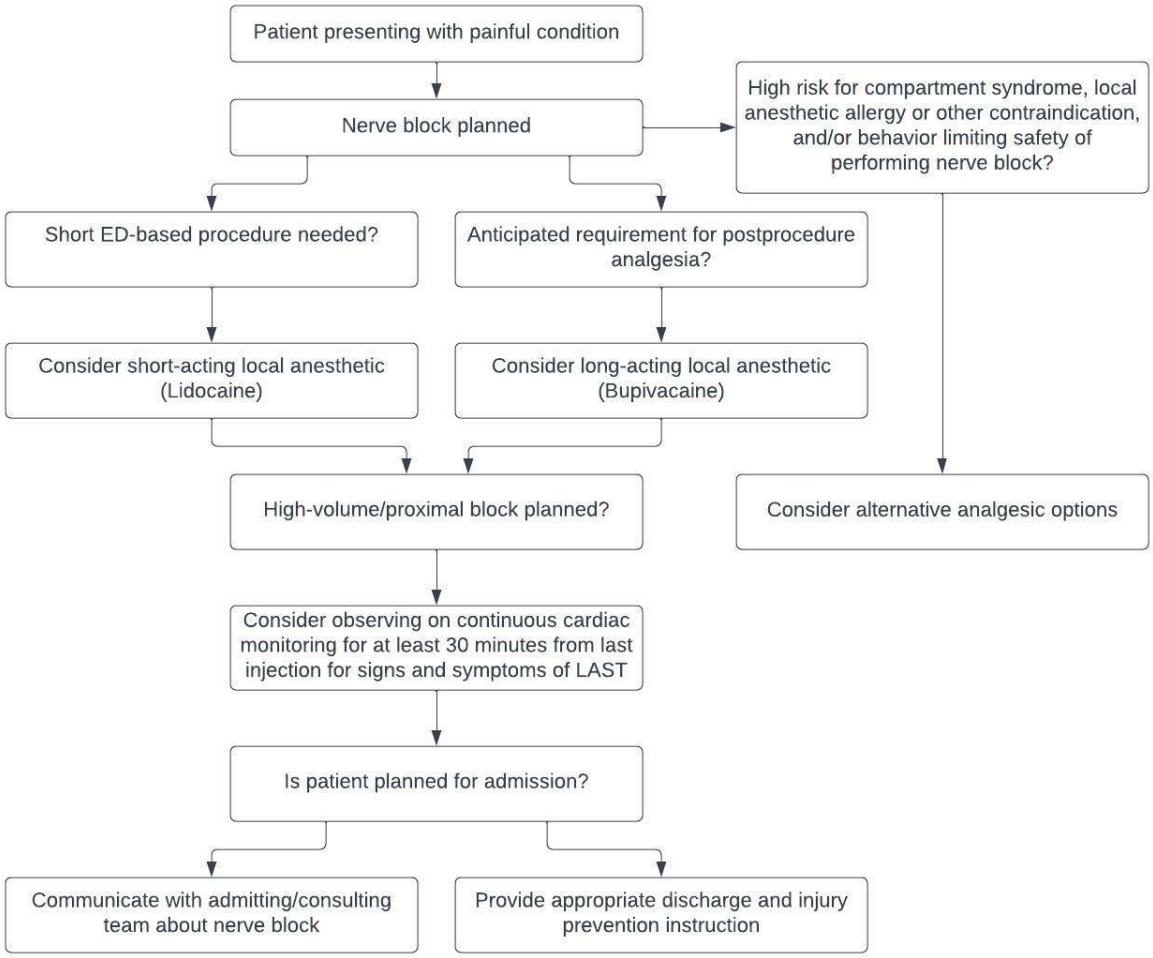
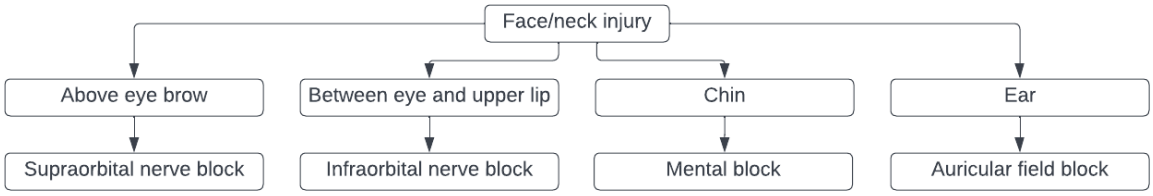
General pathway for nerve block management and common nerve blocks to consider based on anatomic site of injury (other blocks exist, including for torso injuries, and may be appropriate options):



Nerve blocks to consider in face/neck injuries:



Nerve blocks to consider in upper extremity injuries:

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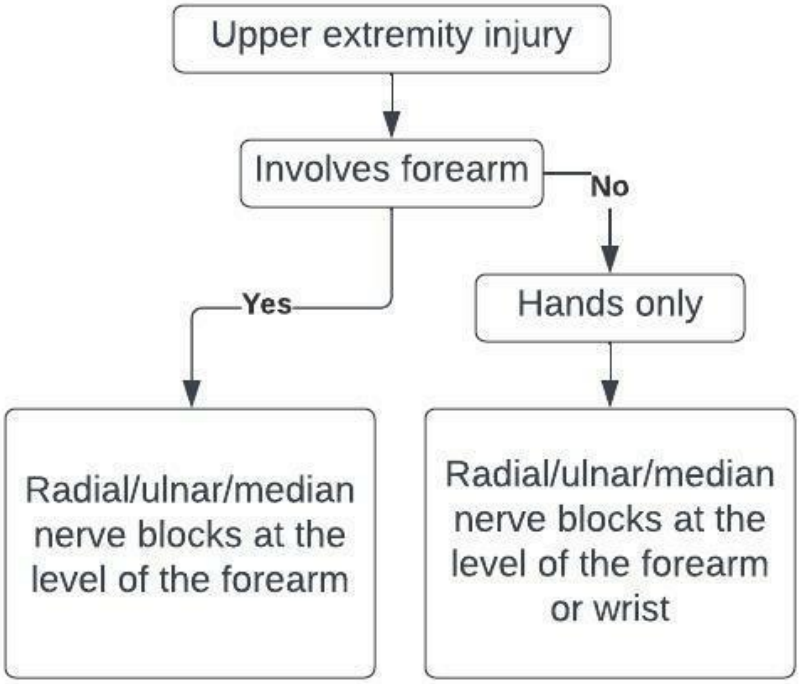
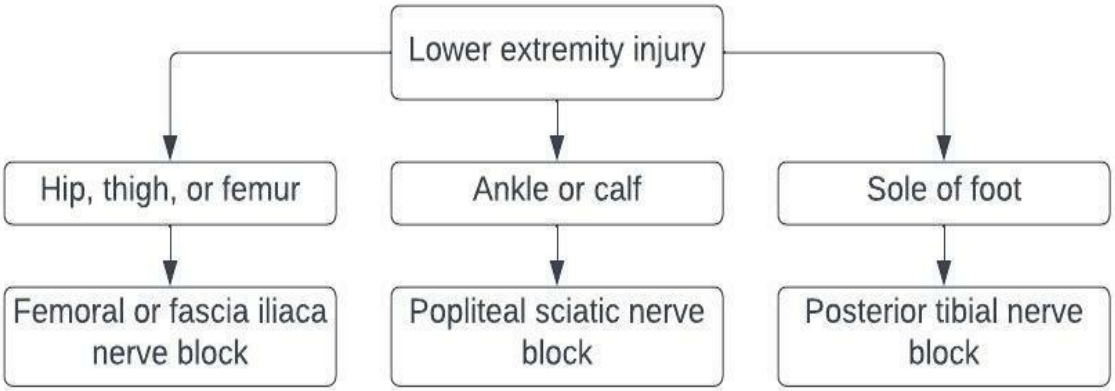
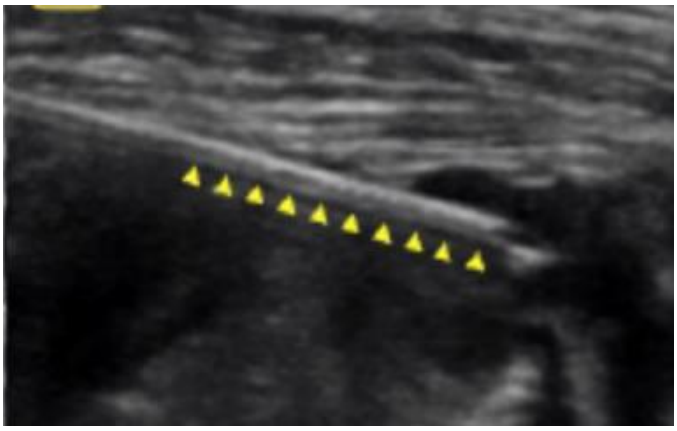


Nerve blocks to consider in lower extremity injuries:





Use of in-plane technique [5]

Warnings and complications:

1. A 0.25% bupivacaine solution is equivalent to anhydrous 2.5mg/mL. The maximum dosage of bupivacaine is 2mg/kg without epinephrine and 3mg/kg with epinephrine.
2. Epinephrine may be considered at provider discretion.
3. When local anesthetic systemic toxicity is suspected, supportive care should be instituted immediately and should follow current ACLS guidelines in addition to airway support as deemed necessary by the provider.[6] In addition to standard therapy, intralipid 20% may be administered in the amount of 1-2ml/kg bolus, repeated 1-2 times if persistent asystole, followed by infusion of 0.25-0.50 ml/kg/minute for 30-60 minutes increased to 0.50 ml/kg/minute if there is refractory hypotension and obtain expert consultation. [7-8]

RESOURCES/REFERENCES

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Effective Date: July 12, 2021

Nerve Block Checklist

Before block:

- Inform consulting service (orthopedics, trauma surgery, anesthesia) of plan to perform ED nerve block as appropriate
- Anatomy scan performed
- Patient identified, 2 criteria (confirm with patient, wristband, name, DOB)
- Review allergies, anticoagulation
- Informed consent
- Neurovascular exam performed and documented before block

- Site marked
- Gather all supplies
- Gather all medication, labeled with concentration
- Patient has IV access and placed on monitor depending on block
- Necessary resuscitation supplies available including lipid emulsion in case of LAST
- Antiseptic technique used

After block:

- Monitor for signs/symptoms of LAST
- Perform and document neurovascular exam
- Appropriate post block care to prevent falls/limb injury/injury prevention to insensate part of body
- Document procedure components
- Inform admitting/consulting team of block when relevant