{Femoral} Nerve Blocks

APLS INSTRUCTORS UPDATE
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RECOMMENDED FEMORAL NERVE BLOCKS

• Blind fascia iliaca block
• Ultrasound guided femoral nerve block
• Femoral nerve block with nerve stimulator

• The blocks above have replaced the blind femoral nerve block as they confer increased efficacy and safety
DO NO HARM: AVOIDING NERVE INJURY

• Aseptic technique
• Use nerve stimulation over blind techniques
• Use of ultrasound and direct visualization
• Use short bevel “blunt” needles
• Slow needle advancement
• Do not elicit paraesthesia
• Use of a 20ml syringe avoids generation of high pressures
• Do not inject when the patient complains of pain
DO NO HARM: AVOIDING NERVE INJURY

• Avoid forceful, fast injections: limit the injection speed to 15-20 mL/minute
• Do not inject when high pressures on injection are met:
  – when injection of the first 1 mL of local anesthetic proves difficult, abandon the injection, withdraw the needle completely and confirm its patency before reinserting.
• Avoid local anaesthetic toxicity: Fractionated injections:
  – Inject smaller doses and volumes of local anesthetics (3-5 mL), pause and aspirate (to check for blood) to avoid inadvertent intravascular injection
The femoral nerve passes underneath the inguinal ligament, lateral to the femoral artery. The blocks are performed just below the ligament.
At this location the nerve is covered by fascia lata (a continuation of the inguinal ligament) and fascia iliaca, which separates it from the femoral artery.
FASCIA ILIACA BLOCK
FASCIA ILIACA BLOCK

Lateral

Fascia iliaca compartment approach

Fascia lata

Femoral nerve

Femoral artery

Fascia iliaca

iliopsoas muscle

Femoral vein
Available evidence in children demonstrates that ultrasound guidance improves the quality, onset, duration and success rate of peripheral nerve blocks and lowers the local anesthetic volume needed.

Are peripheral and neuraxial blocks with ultrasound guidance more effective and safe in children? PEDIATRIC ANESTHESIA Volume 19, Issue 2, February 2009, Pages: 92–96, KASIA RUBIN, DENISE SULLIVAN and SENTHILKUMAR SADHASIVAM
ULTRASOUND GUIDED BLOCK

ASIS

pubic tubercle
ULTRASOUND GUIDED BLOCK
ULTRASOUND GUIDED BLOCK

- Fascia lata
- Fascia iliaca

Lateral: N, A
Medial: V
• Set the nerve stimulator to deliver 1.0 mA (2 Hz, 100 μsec)
• optimally the twitch disappears at 0.2-0.4mA
NERVE STIMULATOR BLOCK

- Nerve stimulator
- Femoral nerve approach
- Fascia lata
- Femoral nerve
- Femoral artery
- Fascia iliaca
- Iliopsoas muscle
- Femoral vein
A randomized controlled trial comparing a fascia iliaca compartment nerve block to a traditional systemic analgesic for femur fractures in a pediatric emergency department.


- Children aged 15 months to 18 years (median 5.7 years) with acute femur fractures,
- 55 patients 26 in the fascia iliaca group and 29 in the morphine sulfate group,
- Prospective, randomized, unblinded, controlled trial
- a difference of 15% in pain scores assessed at 30 minutes from the study's baseline pain management was considered clinically meaningful
A randomized controlled trial comparing a fascia iliaca compartment nerve block to a traditional systemic analgesic for femur fractures in a pediatric emergency department.


- Mean pain scores at 30 minutes after initial treatment were
  - 5.87 for fascia iliaca compartment nerve block
  - 7.54 for morphine sulfate
  - difference of 1.67, which corresponds to an 18% (95% confidence interval [CI] 8% to 27%) difference in pain reduction between the 2 groups, according to the average baseline score of 9.45.

- Clinical Bottom Line: Fascia iliaca block is shown to give better and longer analgesia than systemic opiates and should be considered as an alternative.
Alternatives to sedation for painful procedures.

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• Nerve blocks can also be used to anesthetize specific areas which may be difficult to use topical anesthesia (eg, lip, hand, etc) or are painful because of injection directly into the wound. These may include infraorbital nerve blocks for lip lacerations, ulna or median nerve blocks for hand injuries, and so on.

• Thus, it is important to remember that there are alternatives to conscious sedation which gives good analgesia during the procedure and allows the patient to be discharged sooner
Transthecal digital block: an underutilized technique in the ED.


- The transthecal technique is used on appropriate patients almost to the exclusion of more traditional digital blocks by many hand surgeons.
- The advantages of this method are that it requires only a single injection, has a rapid onset of action, and requires only a small amount of anesthetic. It also has virtually no risk of direct mechanical trauma to the neurovascular bundles.
- This technique has been shown to be exceptionally effective.
- We encourage emergency physicians to use the transthecal technique when indicated.

Evaluation of a transthecal digital nerve block in the injured pediatric patient.


- is a single-injection technique of the midproximal phalanx that has been shown to be technically simple and highly effective in adults.
- 48 patients (50 digits) requiring digital anesthesia were enrolled into the study. The mean age of patients was 8.3 years (median, 7.6 years; range, 0.7-17.5 years)
- The single-injection modified transthecal digital nerve block is a safe and effective method for digital anesthesia in children. These data confirm the applicability of transthecal digital nerve block for children with finger and thumb injuries that require minor surgical procedures
Novel Applications in Pediatric Emergency Ultrasound
Clinical Paediatric Emergency Medicine vol 12, no 1, p53-64 Jennifer Marin

- Ocular ultrasound
- Hip effusion
- Lumbar puncture
- Nerve blocks
- Skull fracture
Axillary block for analgesia during manipulation of forearm fractures in the pediatric emergency department a prospective randomized comparative trial

- Our objective was to compare procedural distress during manipulation of forearm fractures in children
- either axillary (brachial plexus) block regional anesthesia (20 children) or deep sedation with ketamine and midazolam (21 children).
- This was a prospective randomized unmasked controlled comparative trial conducted in an urban children's hospital emergency department.
- The 2 groups were similar in age (older than 8 years), fracture types, initial pain scores, narcotic analgesia received, and midazolam doses before fracture manipulation.
- The primary outcome measure was procedural distress during manipulation as measured with the Children's Hospital of Eastern Ontario Pain Scale (CHEOPS).
- The mean CHEOPS score was 6.4 +/- 2.8 in the group with axillary block and 7.5 +/- 1.6 in those receiving deep sedation;
- the difference between the CHEOPS scores in the 2 groups was not statistically significant (P = 0.126, 95% CI: 2.5, 0.3).
- Axillary block was used successfully in 18 (90%) of the 20 children. No patient in either group experienced any adverse events.
Selective forearm blocks

Median nerve (N) mid humeral level
A = brachial artery, V = vein
Median nerve (N) at cubital fossa

A = brachial artery. Needle approach can be from medial or lateral end of probe.
Radial nerve (N) at mid humeral level
Radial nerve (N) at cubital fossa

Needle approach can be from medial or lateral end of probe
ulnar nerve (N) at cubital fossa