



Just the Facts: Fascia iliaca compartment block for hip fracture pain management

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Case

An 80-year-old female has a trip and fall in her home landing on her left hip and she is brought to the emergency department (ED). The paramedics note a shortened and externally rotated left leg. She is in mild discomfort at rest, but significant discomfort with leg movement.

What are the options for analgesia in this patient? What are the risks and benefits of these treatments?

Opioids are commonly prescribed for patients with hip fractures because they are rapid in onset and titratable. However, elderly patients who receive opioid analgesia for hip fractures are at risk for complications. Non-opioid medications are a useful adjunct for rest pain, but are insufficient for movement pain. The fascia iliaca compartment block (FICB) can effectively manage both rest and movement pain without the systemic side effects of opioids. While FICBs are unlikely to completely eliminate the use of opioids, they have been shown to significantly decrease the need for them [1]. This block can be performed prior to X-ray in situations where clinical suspicion is high (i.e. shortened, externally rotated leg with a history of a fall), to help manage the pain of obtaining an X-ray.

What are the contra-indications for a FICB?

Most patients with a hip fracture are eligible for a FICB, however contra-indications must be considered. Allergy to local anesthetic, depending on the severity of the reaction, may also preclude the use of a FICB. Overlying infection would risk extending the infection into the deeper tissues of the leg. Because of this, sterile technique should be employed. Recent hip surgery, major pelvic trauma, a local hernia or previous femoral bypass surgery could all distort anatomy making the block difficult to perform and if performed, be higher risk for complications. Anticoagulation therapy or bleeding disorders increase the risk of bleeding, although therapeutic anticoagulation should not automatically preclude this block. The decision to perform the block in a patient on anticoagulation therapy should be tailored to the individual patient. If performed, an ultrasound guided block would be safer.

What local anesthetic do I use to perform the block? What is a safe dose to use?

The ideal local anesthetic should have a rapid onset and long duration of action. Ropivacaine fulfills these criteria [2]. If you do not have access to this local anesthetic, providers should choose a slower onset, long acting local anesthetic such as Bupivacaine, over a fast onset, short acting local anesthetic such as Lidocaine. Providers are discouraged from combining local anesthetics, as their toxicities are CUMULATIVE, so you can NOT use up to the potentially toxic dose of two local anesthetics. Local anesthetic systemic toxicity is a potentially lethal complication of nerve blocks [3].

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Do I need an ultrasound guidance to perform this block?

Ultrasound guidance is the preferred and superior technique for a FICB if the equipment and the skills are available, however this block can be done reasonably safe and effective without ultrasound. The need to directly visualize the nerve before injecting is lessened because the block is filling a fascial compartment as opposed to infiltrating directly adjacent to a nerve. A systematic review of prehospital provider administered FICBs demonstrated a success rate of 90% across 254 landmark-based FICBs with only one complication of transient tachycardia [4]. Landmark-based FICBs are commonly performed in Australian and New Zealand EDs.

What are the risks and side effects of a FICB? What kind of monitoring do these patients need?

FICB risks include infection, bleeding, and nerve injury. Intravascular injection of a large volume of anesthetic may be dangerous, potentially causing local anesthetic systemic toxicity. This complication is incredibly rare [2], however cardiac monitoring before, during and post-procedure are recommended to detect local anesthetic systemic toxicity. Proper documentation including marking the time, date, name and dose of local anesthetic on the patient's skin is important to ensure all care providers are aware the block was performed.

What are the barriers for patients to receive a FICB in the ED? How do you overcome them?

Barriers for FICBs include: unfamiliarity with the procedure and contra-indications, uncertainty about local anesthetic dosing, lack of experience with ultrasound for nerve blocks, fear of complications, and lack of time. These barriers can be overcome through quality improvement processes,

demonstrated by The Australia and New Zealand Hip Fracture Registry. In 2018, 84% of hip fracture patients in Australia and New Zealand received a nerve block, and 69% of them received it before surgery [5].

Many Australian and New Zealand EDs have a printed procedure guide readily available for review prior to completing the procedure. Practitioners are encouraged to use ultrasound, but if they are not comfortable, the landmark-based technique is acceptable and encouraged. Their EDs often have all necessary supplies bundled to save time. Mid-level providers may administer the block so the patient can still receive it even if the physician is too busy. Some sites have declared this diagnosis a 'surgical emergency' to create the culture that this procedure is a high priority intervention. The importance of this procedure is regularly communicated with staff, to maintain the culture of the importance of this procedure (Fig. 1).

Case resolution

Your ED has created a policy around FICBs in the ED in collaboration with Orthopedics and Anesthesia. There is a supply bundle in the suture carts with everything you need to perform the procedure, including a visual procedure guide. Because of your high clinical suspicion of hip fracture, you decide to perform the procedure prior to X-ray. You notify your nursing staff that you are performing the block so the patient can be monitored for complications. After performing the FICB, you document the time, as well as the name and dose of local anesthetic on the patient's skin. The patient's pain score prior to the procedure was 7/10, and 20 min after the block is down to 2/10. She tolerates being moved for X-ray quite well, and does not require any opioid analgesia in the ED. You diagnose an inter-trochanteric hip fracture on X-ray, consult Orthopedic surgery and communicate to them that you have managed her pain with a FICB.

FASCIA ILIACA COMPARTMENT BLOCK

INDICATIONS

Pain control in patients with highly suspected or confirmed hip fracture.

CONTRAINDICATIONS

- infection of the skin
- known allergy to anesthetics
- uncooperative patient
- distorted inguinal or hip anatomy (recent hip or inguinal surgery, previous femoral bypass, major pelvic trauma)
- patient on oral anticoagulation (relative contraindication)

GATHER YOUR SUPPLIES

The ideal local anesthetic (LA) is rapid onset and long acting (ie. Ropivacaine). If you do not have access to this LA, the provider should choose a slower onset, long acting LA (ie: Bupivacaine) over a fast onset, short acting (ie: Lidocaine) LA. Providers are discouraged from combining Lidocaine and Bupivacaine as LA toxicities are cumulative; you cannot use up to the potentially toxic dose of both of these medications. Regardless of the choice of LA, the total amount of fluid injected needs to be 30-40mLs in order to be effective in reaching all 3 nerves in the fascial space. Add saline to your LA volume to total 30-40mLs. Dosage is dependent on the patients ideal body weight. Consider lowering the dose in frail elderly patients low body mass or those with renal or liver dysfunction and heart failure.

local anesthetic	max dose/kg	max dose >50 kg
ropivacaine	3 mg/kg	150 mg
bupivacaine	2.5 mg/kg	125 mg

Local anesthetic volume is dependent on the concentration. Check this closely before administration.

- disinfectant for skin
- pen to mark skin
- blunt tip needle
- 20mL syringes x 2
- local anesthetic
- normal saline
- sterile probe cover
- nerve block needle (blunt tip) with tubing

ULTRASOUND GUIDED IS THE PREFERRED TECHNIQUE. LANDMARK APPROACH CAN BE USED IF ULTRASOUND MACHINE/EXPERTISE IS NOT AVAILABLE.

LANDMARK	<ol style="list-style-type: none"> Obtain informed consent. Ensure functioning IV is in place and patient is adequately monitored. Draw a line on the skin between the pubic tubercle to the ASIS on affected side. Divide into thirds. Insertion point for the landmark approach is 1 cm inferior to the line dividing the lateral and medial thirds. Palpate for ipsilateral femoral pulse, it should be 1-2 cm medial to your insertion point. <div style="display: flex; justify-content: space-around;"> </div>				
ANATOMY	<ol style="list-style-type: none"> Review anatomy in both the cranial/caudal and lateral/medial planes. <div style="display: flex; justify-content: space-around;"> </div>				
PROCEDURE	<table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; text-align: center;">ULTRASOUND GUIDED</th> <th style="width: 50%; text-align: center;">LANDMARK APPROACH</th> </tr> <tr> <td style="vertical-align: top;"> <ol style="list-style-type: none"> Disinfect the skin. Place sterile probe cover, gather sterile gel. Identify your femoral vessels with the probe in transverse. Consider local anesthetic of skin insertion site. Slide your probe laterally so your artery and nerve are at the medial field of view of your probe. Insert the needle laterally to the US probe at a 45-60° angle 'in plane' towards the visualized femoral nerve. Visualize and feel your needle pierce the two fascial layers. Inject lateral to the femoral nerve, ensuring that the fluid is inferior to the fascia iliaca. Consider injecting saline only first to confirm location. Inject entire volume of LA and saline. A second person is recommended for injection. </td> <td style="vertical-align: top;"> <ol style="list-style-type: none"> Disinfect the skin. Consider local anesthetic at insertion site. Pierce the skin at a 90° angle. Point the needle 60° cranially. Advance through two 'pops' as you feel your needle go through the fascia lata and fascia iliaca. Transition to 30° cranially and advance 1-2mm. Aspirate. Slowly inject anesthetic, aspirating every 5mL. Inject the entire volume of LA and saline. A second person is recommended for injection. </td> </tr> </table>	ULTRASOUND GUIDED	LANDMARK APPROACH	<ol style="list-style-type: none"> Disinfect the skin. Place sterile probe cover, gather sterile gel. Identify your femoral vessels with the probe in transverse. Consider local anesthetic of skin insertion site. Slide your probe laterally so your artery and nerve are at the medial field of view of your probe. Insert the needle laterally to the US probe at a 45-60° angle 'in plane' towards the visualized femoral nerve. Visualize and feel your needle pierce the two fascial layers. Inject lateral to the femoral nerve, ensuring that the fluid is inferior to the fascia iliaca. Consider injecting saline only first to confirm location. Inject entire volume of LA and saline. A second person is recommended for injection. 	<ol style="list-style-type: none"> Disinfect the skin. Consider local anesthetic at insertion site. Pierce the skin at a 90° angle. Point the needle 60° cranially. Advance through two 'pops' as you feel your needle go through the fascia lata and fascia iliaca. Transition to 30° cranially and advance 1-2mm. Aspirate. Slowly inject anesthetic, aspirating every 5mL. Inject the entire volume of LA and saline. A second person is recommended for injection.
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FINISH	<ol style="list-style-type: none"> Remove the needle and place a dressing over the puncture site. Label patient's leg with date, time of the procedure, type and dose of local anesthetic. Inform nursing staff in ED, and the consulting service team that you performed the FICB. Complete a procedure note in chart. Ensure patient is adequately monitored 20-30 minutes post-procedure for complications. Check the patient's pain score 20 minutes after the block. Provide adjunctive analgesia as needed. Do not repeat the block. 				

LOCAL ANESTHETIC SYSTEMIC TOXICITY

SIGNS & SYMPTOMS

CNS: perioral numbness, metallic taste, mental status changes or anxiety, visual changes, muscle twitching, seizures

Cardiovascular: tachycardia and hypertension, or bradycardia and hypotension, ventricular arrhythmias

MANAGEMENT

Stop injecting local anesthetic

Call for help: call for LAST rescue kit

If pulseless, start CPR

Give lipid emulsion therapy immediately

Always management: ventilation with 100% O2, avoid hyperventilation, advanced airway if needed

Control seizures: benzodiazepines first line, avoid the use of propofol

Treat hypotension and bradycardia

LIPID EMULSION 20% <small>precise volume/flow rate not crucial</small>	
PATIENT > 70kg	PATIENT < 70kg
<ol style="list-style-type: none"> ILP bolus: 100mL over 2-3 min ILP infusion: 200-250mL over 15-20 min 	<ol style="list-style-type: none"> ILP bolus: 1.5mL/kg over 2-3 min ILP infusion: ~0.25mL/kg/min IBW

patient remains unstable? Re-bolus the same dose and double infusion rate. Your maximum dose is 12mL/kg. Total volume of lipid emulsion can approach 1L in a prolonged resuscitation (>30 minutes).

Infographic created by Dr. Sarah Henschke and edited by Dr. Rob Woods, University of Saskatchewan

Fig. 1 Fascia iliaca compartment block procedure guide

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