

The Fascia Iliaca Compartment Block: Review Article

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Abstract:

Fascia Iliaca Compartment Block (FICB) has become an essential component of multimodal analgesia for patients suffering from acute pain related to hip fractures, femoral trauma, and lower-limb surgeries. Pain originating from these conditions is often severe and may be difficult to control using systemic analgesics alone, especially in vulnerable populations such as elderly patients. Opioid-based regimens, although effective, are associated with adverse effects including respiratory depression, sedation, gastrointestinal dysfunction, and an increased risk of postoperative delirium. These limitations have driven the expanding use of regional anesthesia techniques that provide effective pain relief while minimizing systemic drug exposure. The anatomical basis of FICB allows for broad sensory blockade by targeting the femoral nerve, lateral femoral cutaneous nerve, and to a lesser extent the obturator nerve through the deposition of local anesthetic beneath the fascia iliaca. This results in substantial analgesia of the anterior and lateral thigh as well as the hip joint. With the introduction of ultrasound guidance, the accuracy and reliability of FICB have improved significantly, enhancing onset time, block success rate, and overall patient satisfaction. As enhanced recovery pathways continue to emphasize early mobilization and opioid-sparing strategies, FICB is increasingly recognized as a valuable tool in perioperative pain management.

Keywords: Fascia iliaca compartment block; Regional anesthesia; Hip fracture; Femoral nerve; Ultrasound-guided block; Acute pain management; Lower limb surgery.

Introduction:

Fascia Iliaca Compartment Block (FICB) is a regional anesthesia technique designed to provide effective analgesia for acute pain originating from the hip, thigh, and femoral shaft. It targets the femoral, lateral femoral cutaneous, and obturator nerves by depositing local anesthetic beneath the fascia iliaca, allowing for broad sensory blockade with minimal risk of complications. Because these nerves are responsible for most of the nociceptive input associated with hip fractures, femoral trauma, and certain lower-limb surgical procedures, FICB has emerged as a valuable component of multimodal analgesia protocols (1).

The technique is particularly useful in elderly patients presenting with hip fractures, in whom opioids may lead to respiratory depression, delirium, nausea, and other adverse effects. FICB offers an opioid-sparing approach that reduces systemic analgesic requirements, improves patient comfort, and facilitates early mobilization. With the rising global burden of hip fractures and the growing emphasis on enhanced recovery pathways, interest in regional blocks such as FICB has increased substantially (2).

Recent advancements, including ultrasound guidance, have further improved the consistency and safety of FICB by allowing accurate needle placement and spread of local anesthetic. Studies have shown that ultrasound-guided FICB provides faster onset, better pain relief, and fewer complications compared with landmark-based techniques. Despite its proven efficacy, ongoing research continues to compare different approaches, drug volumes, and concentrations to optimize block success and patient outcomes (3).

Anatomy of fascia iliaca compartment :

The fascia iliaca compartment (FIC) is a potential space in the inguinal region just above the upper thigh. Fascia iliaca extends from the lower thoracic vertebrae to the anterior thigh, it lines the pelvis and the posterior abdomen. The psoas major and iliacus muscles are covered by fascia iliaca. The posterior wall of femoral sheath is formed by the fascia iliaca which contains the femoral artery, vein and the genitofemoral nerve. The fascia iliaca attaches on the lateral aspect by the thoracolumbar fascia, iliac crest, anterior superior iliac spine (ASIS) and the sartorius fascia. Medially it attaches by the pectineal fascia. Anteriorly fascia iliaca attaches with the posterior portion of inguinal ligament as well as fascia lata (4) (figure 1).

Neurovascular relations:

1. Medially, fascia iliaca forms the posterior wall of the femoral sheath that consists of the femoral artery and vein.
2. Laterally, fascia iliaca forms the roof of the lacuna musculorum that contains the iliacus muscle, psoas major muscle and the femoral nerve (4).

Fascia iliaca compartment has the following limits:

Anteriorly, the posterior surface of the fascia iliaca, which covers the iliacus muscle and all the surface of the psoas major muscle. **Posteriorly**, the psoas major muscle and the anterior surface of the iliacus muscle. **Medially**, femoral triangle. **Laterally**, the inner lip of the iliac crest and FIC is in continuation with the space between the quadratus lumborum muscle and its fascia (5).

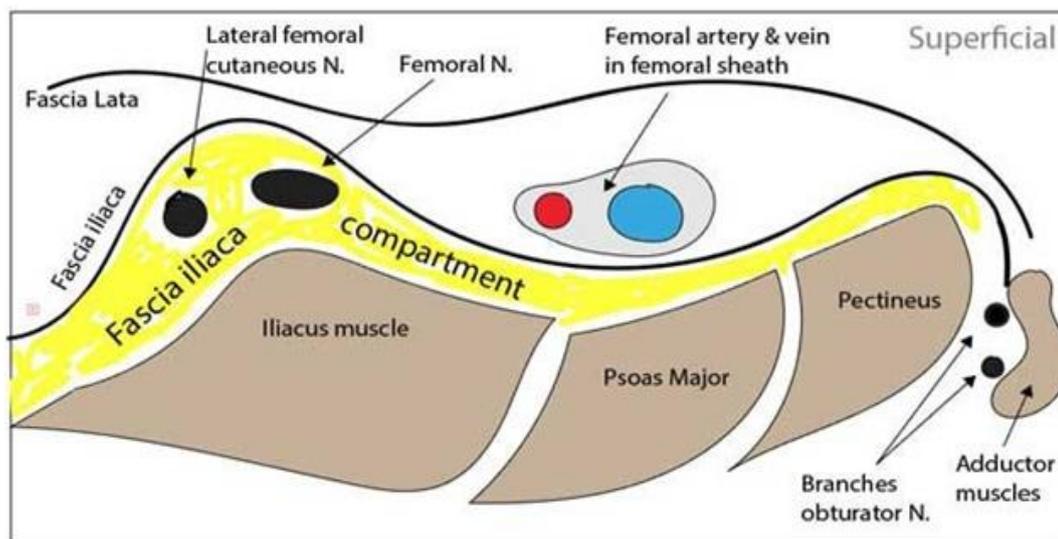


Figure 1: Fascia iliaca compartment anatomy (6).

Fascia iliaca compartment block :

Fascia iliaca compartment block (FICB) is a peripheral nerve block, which was first reported by (1). As an alternative to the 3-in-1 nerve block, it is now one of the major methods of lower limb nerve block and is widely used for anesthesia and analgesia in patients for lower limb surgery. More specifically, the femoral, lateral femoral cutaneous, and obturator nerves of the thigh are blocked by local anesthetic (LA) injected under the fascia of iliacus muscle. However, the pop technique depending on fascial click had a low success rate of 35%–47%. When FICB was performed using ultrasound guidance, the success rate increased to 82%–87%, that lead to an increased interest in FICB as anesthetic and analgesic option for lower limb surgery (7).

Indications:

- Postoperative pain control in patients undergoing total knee and hip arthroplasties (8).
- Postoperative analgesia for patients undergoing arthroscopic anterior cruciate ligament (ACL) reconstruction with patellar graft or medial meniscus surgery (9).
- Preoperative analgesia: FICB decreases pain scores, reduces opioid consumption and facilitates positioning for spinal anesthesia in hip fracture patients (10).
- Anesthesia for anterior, medial and lateral aspect of the thigh as in femoral thrombectomy surgery and thigh abscess (11).

Contraindications:

Common to all blocks

Patient refusal

Anticoagulation

Inflammation or infection at injection site

Allergy to local anesthesia

Related to FICB:

Previous femoral bypass surgery (12).

Methods of Fascia Iliaca Block:

(A) Anatomical Landmark Method:

This method depends mainly on two pop technique: the first pop as the needle passes through fascia lata and the second pop as it passes through the fascia iliaca. The landmarks for this block are the anterior superior iliac spine(ASIS) and the pubic tubercle of the same side. Draw a line between these two points then divided this line into three thirds. Mark the point 1cm caudal at the junction of the lateral and middle one third. It is entry point of the injection (figure 2) (13).

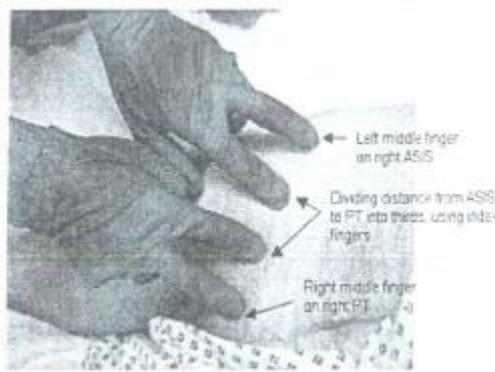


Figure (2a). the injection site for a right-sided fascia iliaca block. Divide a line between the anterior superior iliac spine(ASIS) and pubic tubercle(PT) into thirds. The left index marks the junction of the lateral and middle third of the line joining anterior superior iliac spine with pubic tubercle. Finger marks the connection of the lateral and middle 1/3 of the line joining ASIS with PT.



Figure (2b). Right fascia iliaca block. Injection entry point is approximately 1cm caudal from the junction of lateral and middle third indicated by left index finger .

Figure 2: The injection site for a right sided fascia iliaca compartment block (13).

(B) Ultra Sound Guided Methods: The fascia iliaca presents anterior to the iliacus muscle within the pelvis .Superolaterally ,it is bounded by the iliac crest while medially it fuses with the fascia covering the psoas muscle. Both the femoral and lateral cutaneous nerves of the thigh present under the fascia iliaca in their course within the pelvis **(14)** (figure 3).

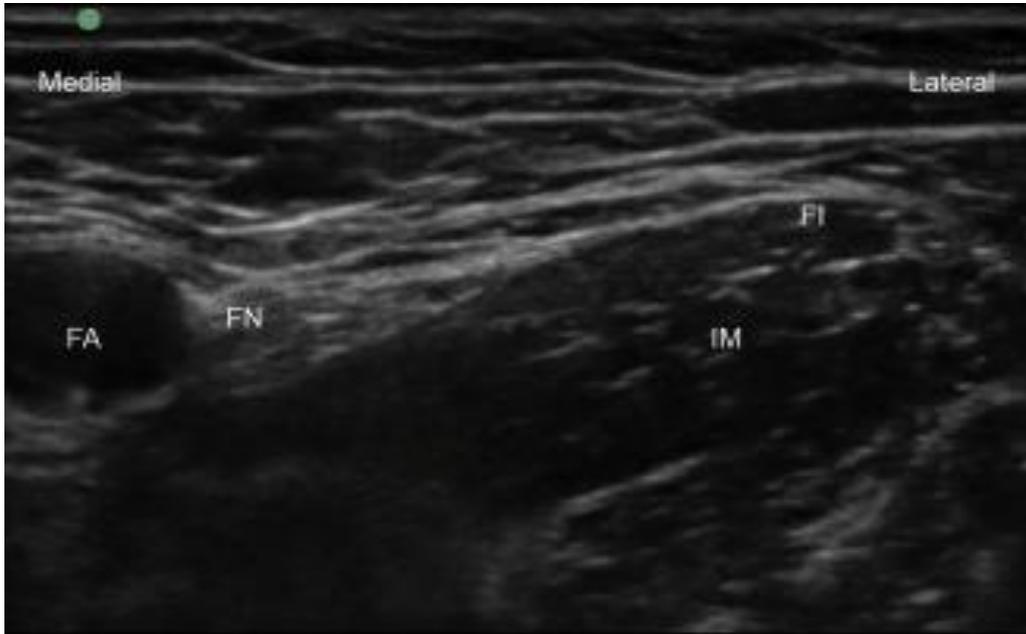


Figure 3: Sono anatomy of approach of infra inguinal fascia iliaca compartment block. FA femoral artery, FN femoral nerve, FI fascia iliaca, IM iliacus muscle **(15)**.

Preparation:

Preparation is necessary for achieving a successful and safe compartment block. Consent should be obtained first. The site of the planned compartment block should be marked with a surgical marking pen. The equipment and supplies necessary for completing the procedure should be collected and set up in the room **(12)**.

Patient position :

The patient should be in the supine position with the hip is extended by laying the patient flat.

Fascia Iliaca Block Approaches:

1- Supra inguinal fascia iliaca block:

After proper position ,sterile cover is applied to high frequency US linear probe. Place the probe just medial to the anterior superior iliac spine in parasagittal orientation. Slide the probe infero medially along the course of the inguinal ligament . As the probe is moved back and forward ,the ilium and the anterior inferior iliac spine (AIIS) are identified. The AIIS forms the attachment of rectus femoris muscle that can be identified by sudden rising of bony shadow toward the transducer as the probe is moved laterally. At this level the bow tie sign is seen ,which formed of the sartorius muscle caudally and the transvers abdominus and internal oblique muscles cranially. Deep to the bow tie ,lies the iliopsoas muscle and its immediately overlying hyperechoic fascia iliaca . Identify the deep circumflex iliac artery which is an important vascular landmark .Introduce the needle in in plane direction just below or above the inguinal ligament in caudal to cranial direction .The fascia iliaca is penetrated after negative aspiration ,then inject local anesthesia figure(4)**(16)**.

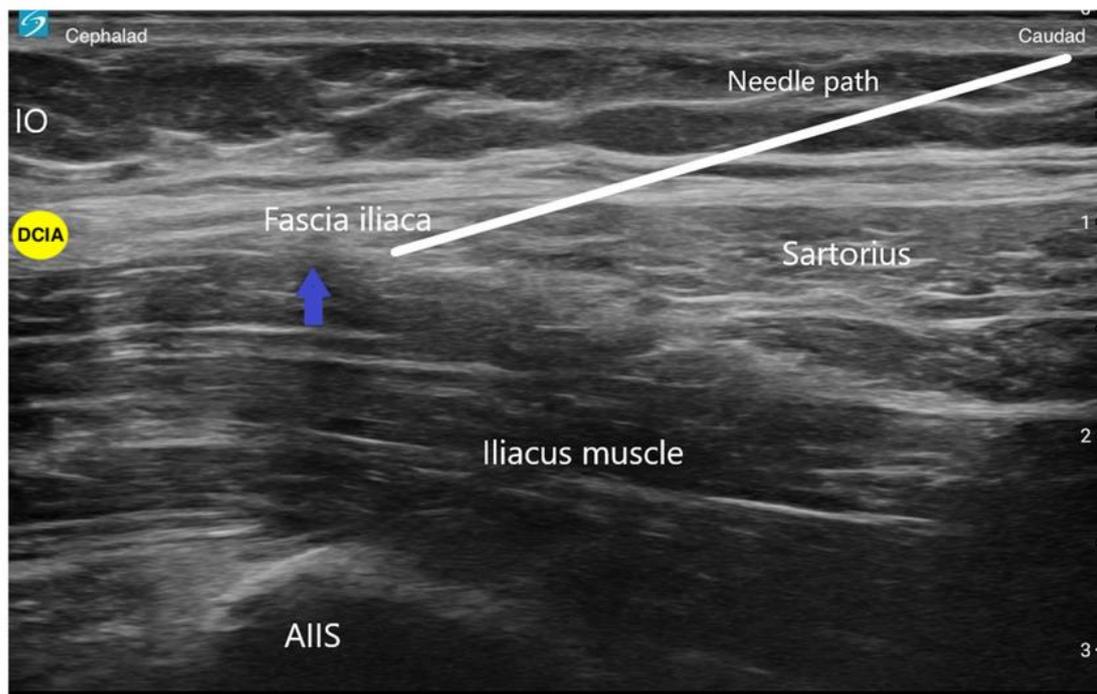


Figure (4): Sono anatomy of supra-inguinal fascia iliaca block. The white line represents the direction of the needle. The blue arrow represents the location of local anesthetic injection. IO (internal oblique muscle); AIIS (anterior inferior iliac spine); DCIA (deep circumflex iliac) (16).

2-Infra inguinal fascia iliaca block:

Also after proper position, sterile cover is applied to high frequency US linear probe. place the probe 1cm caudal at the junction of the lateral and middle one third line between pubic tubercle and ASIS. Anatomical orientation starts with the same method as the femoral nerve block: identifying the femoral artery at the level of the inguinal crease. If it is not immediately visible, medial and lateral sliding of the transducer will eventually bring the vessel into the view. Immediately lateral and deep to the femoral artery and vein is a large hypoechoic structure, the iliopsoas muscle. It is covered by a hyperechoic fascia (fascia iliaca), which can be seen separating the muscle from the subcutaneous tissue superficial to it. The hyperechoic femoral nerve should be seen lateral to the femoral artery, between the iliopsoas muscle and the fascia iliaca. Moving the transducer laterally several centimetres brings it into view the sartorius muscle covered by its own fascia as well as the fascia iliaca. The needle is introduced in in-plane approach. As the needle passes through fascia lata, the first pop is felt, then the needle passes through fascia iliaca, the second pop is felt. Following -ve aspiration, 1 to 2mL of LA is injected to confirm the adequate injection between the fascia iliaca and ilio psoas muscle. In an adult patient, 30-40mL of LA is often required for efficient blockade. The blockade success is best expected by observation of the spread of the LA medially toward the femoral nerve and laterally underneath the sartorius muscle. In the obese cases, an out of plane approach might be favored owing to subcutaneous fat. The blockade has to be accompanied by a blockade of the femoral nerve in whole cases 100% and lateral femoral cutaneous nerve (90%). Blockade of anterior division of the obturator nerve is unreliable with infra inguinal fascia iliaca blockade (15).

Distribution of Local anesthesia:

The distribution of anesthetic agents in the fascia iliaca compartment is mainly depended on spread of the LA and the nerves which are blocked. Femoral nerve blockade caused anesthesia of the anterior and medial aspect of thigh and of a variable strip of skin on the medial aspect of leg and foot. Obturator nerve block caused anesthesia of medial aspect of the thigh. The LFCN delivered cutaneous innervation to the anterolateral thigh (11).

Considerations:

- The probe is positioned transverse at junction between lateral and middle 1/3 of the line attaching ASIS to the pubic tubercle at the level of the inguinal crease.
- The aim is to put the needle tip underneath the fascia iliaca and nearly inject large volume of LA until it spreads laterally toward LFCN and medially toward the femoral nerve under direct US visualization.
- Thirty to forty mL of LA is necessary to achieve the block because of the fascia iliaca compartment is a large-volume blockade and its success is mainly depended on the spread of LA along a connective tissue plane. LA distribution is observed by using the US (11).

Complications of Fascia Iliaca Block:

Intravascular injection, local anesthetic toxicity, temporary or permanent nerve damage, infection, block failure and allergy to any of the preparations used for FICB (17).

Generally a FICB has a very low hazard profile. The location of the FICB injection means the risk of intravascular injection, local anesthetic toxicity and mechanical nerve damage is extremely low. Good aseptic technique will minimize the risk of infection. The injection of a large volume of local anesthetic ensures good spread and reduces the risk of failure. The risk of local anesthetic toxicity is highest within the first 15 minutes after injection, which makes close monitoring mandatory (17).

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