CASE REPORT

Fascia Iliaca Compartment Block as Pain Management for Postoperative Femur Fracture in the Elderly: A Case Report

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ABSTRACT

Background: Femur fractures are most common in geriatric patients, necessitating careful consideration of perioperative medications. Effective pain management is crucial to minimize neurohormonal stress responses. Reducing opioid use in older patients can prevent side effects and complications. The fascia iliaca compartment block is a safe and efficient nerve block method, known to decrease opioid needs in hip surgery. It is anticipated to enhance mobilization speed and ambulation and reduce postoperative nausea, vomiting, deep vein thrombosis, and pneumonia, thereby improving overall outcomes for geriatric patients undergoing hip surgery.

Case: A 71-year-old female with a closed right intertrochanteric femur fracture underwent open reduction and internal fixation with a proximal femoral nail antirotation. Classified as ASA II, geriatric, with stage I hypertension, her preoperative vital signs included a blood pressure of 170/95 mmHg, heart rate of 65 beats per minute, respiration rate of 20 times per minute, and SpO2 of 98% with nasal cannula oxygen at 3 lpm. Spinal anesthesia was administered at L3-L4, and a fascia iliaca compartment block was performed postoperatively. Pain assessment, rescue analgesic use, and postoperative nausea were evaluated post-surgery, with monitoring at 6, 24, and 48 hours.

Discussion: Pain management with regional fascia iliaca compartment block anesthesia can simultaneously block the femoral nerve, obturator nerve, and lateral femoral cutaneous nerve. Thus minimizing systemic symptoms compared to analgesics administered intravenously. In this case, the administration of 30 cc levobupivacaine via fascia iliaca compartment block provided effective analgesia for up to 72 hours post-blockade in a geriatric patient without causing side effects such as postoperative nausea.

Conclusion: Postoperative fascia iliaca compartment block for hip surgery in geriatric patients provides effective analgesia with minimal side effects.

Keywords: anesthesia; block; compartment; fascia; hip; iliaca; surgery

INTRODUCTION

Femur fractures can occur in almost all age groups and typically require surgical intervention, with the highest incidence in the elderly. In 90% of hip fracture cases, including femur fractures, they occur in individuals over the age of 65.[1,2] Regional anesthesia via subarachnoid block is commonly used in orthopedic procedures as an anesthetic method that can reduce mortality and morbidity, decrease the incidence of deep vein thrombosis (DVT), lower the occurrence of postoperative delirium, shorten hospital stays, and reduce cardiovascular impact compared to general anesthesia.[3] Femur fractures are usually painful bone injuries because they involve the periosteum, which has a very low pain threshold and deep somatic structure, resulting in high levels of pain both before and after surgery. Failure to manage pain before and after surgical procedures will increase the neurohormonal stress response, leading to a higher risk of cardiovascular complications during and after surgery. Therefore, effective pain management is crucial.[4]

Several approaches to pain management in these patients include the use of multimodal analgesia with NSAIDs, opioids, and peripheral nerve blocks (PNB). Several studies have revealed that effective pain management is crucial, enabling patients to ambulate quickly and reducing complications from prolonged immobility. [5,6]

In femur fracture surgeries, pain management typically involves the use of opioids. Opioids are associated with several side effects such as nausea, vomiting, and respiratory distress. They also contribute to postoperative delirium. Therefore, minimizing opioid use is essential to avoid unwanted complications in patient care, especially in the elderly, such as hypoventilation and apnea.[7,8]

As age increases, pain levels also tend to rise. Pain management in geriatrics is particularly challenging due to decreased muscle mass, reduced body water, and other physiological factors affecting drug distribution and pain management.[8]

In femur fracture surgeries, one option for pain management is the use of opioids. Opioids are associated with several side effects such as nausea, vomiting, and respiratory distress. They can also cause postoperative delirium. Therefore, minimizing opioid use is crucial to avoid complications such as hypoventilation and apnea.

The fascia iliaca compartment block (FICB) is a very safe, efficient, and easy-to-learn block method. The injection is performed using landmarks with ultrasound guidance, by administering local anesthesia beneath the fascia iliaca to block the femoral nerve (FN), obturator nerve (ON), and lateral femoral cutaneous nerve (LFCN) simultaneously. FICB has been reported to reduce opioid requirements in patients undergoing hip surgery, with the aim of improving mobilization speed, ambulation, reducing postoperative nausea and vomiting (PONV), the incidence of deep vein thrombosis (DVT), and pneumonia.[9,10]

The purpose of this case report is to assess the effectiveness and safety of using FICB for postoperative pain management in geriatric patients undergoing hip surgery.

CASE

A 71-year-old female patient diagnosed with a closed femoral neck fracture is scheduled for ORIF PFNA. The patient has an ASA II physical status with issues including geriatrics and stage I hypertension. Thoracic X-ray results show aortic elongation (Figure 1), and femur X-ray shows intertrochanteric discontinuity of the right femur (Figure 2). The patient was prepared on the operating table with blood pressure of 170/95 mmHg, heart rate 65 beats per minute, respiration rate 20 times per minute, SpO2 98% on nasal cannula at 3 lpm. Anesthesia was administered via spinal anesthesia after premedication with dexamethasone 5 mg and ondansetron 4 mg.

Spinal anesthesia was performed using a medial approach at L3-L4 with 0.5% isobaric levobupivacaine 12.5 mg and fentanyl 25 mcg. After confirming a successful block, positioning and draping were done, and the surgery commenced. The operation lasted 2 hours with 200 cc of blood loss. Postoperatively, a Fascia iliaca compartment block (FICB) was performed. The patient was positioned supine with maximal extension of the lower extremities. Landmarks were identified by locating the ASIS using ultrasound guidance. The transducer was positioned medially oblique. The ultrasound probe identified the fascia iliaca, sartorius muscle, and circumflex iliac artery. A 90-mm 22-gauge needle was inserted through the skin, subcutaneous fat, fascia lata, and just below the inguinal fascia, appearing hyperechoic on ultrasound (Figure 3). After confirming the needle tip was below the fascia lata, 1-2 cc of local anesthetic was injected, followed by 30 ml of 0.25% levobupivacaine (Figure 4). Outcomes assessed for this patient included VAS at T1 (6 hours post-op), T2 (24 hours post-op), T3 (48 hours post-op), T4 (72 hours post-op), incidence of PONV, and rescue analgesic opioid use (Table 1).

Figure 1. Chest X-ray shows aortic elongation

Figure 2. X-Ray femur D : intertrochanter discontinuity

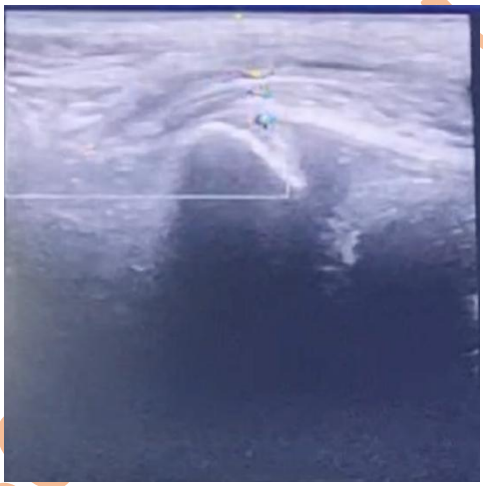

Figure 3. US fascia iliaca before FICB

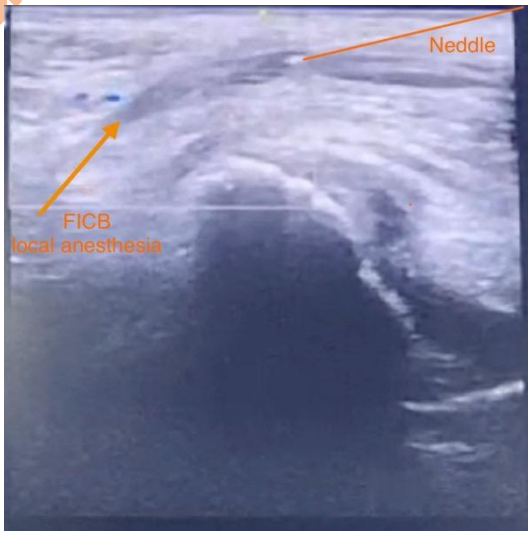

Figure 4. US fascia iliaca after FICB

Table 1. Table of NRS, rescue analgetic, PONV

Time	VAS	PONV	Rescue Analgetic
T1	1-2	Not found	No rescue
T2	1-2	Not found	No rescue
T3	1-2	Not found	No rescue
T4	1-2	Not found	No rescue

VAS: visual analog score; PONV: postoperative nausea and vomiting

DISCUSSION

Intertrochanteric femur fractures typically occur in the elderly, accounting for 45-50% of all hip fractures, with pain levels around 45-50%. Therefore, adequate pain management is essential. Postoperative mobilization should be initiated promptly; otherwise, there is an increased risk of deep venous thrombosis in the lower extremities, lung infections, and increased mortality.[11] Adequate pain management improves pain quality and reduces complications.

Peripheral nerve blocks do not affect hemodynamics and consciousness compared to the use of opioids for pain management.[12] Notably, PNB is recommended as the first-line analgesia for lower extremity surgeries due to its ability to reduce opioid dosage requirements, shorten postoperative recovery, and thus shorten bed rest phases, preventing the risk of pneumonia. The fascia iliaca compartment block (FICB) is a type of PNB consistently reported to manage perioperative pain by blocking the lateral femoral cutaneous, genitofemoral, femoral, and obturator nerves within the fascia iliaca compartment.

The fascial iliaca compartment is located between the iliopsoas muscle and the iliac fascia, where three lumbar plexus nerves are found: the femoral nerve, the lateral cutaneous nerve, and the obturator nerve. The fascia iliaca compartment block (FICB) has been proven to be safe and easy, and is commonly used for perioperative analgesia in hip surgeries (Figure 5).[13] The dosage used in the fascial compartment block depends on the distribution and volume of local anesthesia. The recommended dose is 30-40 cc below the fascia, typically using the agent levobupivacaine at a concentration of 0.2%-0.3%. In this patient, we used a combination of landmark-based and ultrasound-guided FICB, with a volume of 30 cc at a concentration of 0.25%. To achieve a block of all the targeted nerves, a larger volume is often required. A clinical study mentioned that 69% blockade was achieved with a volume of 40 cc of local anesthesia, but this also raises concerns about the toxic dose of local anesthetics. Therefore, we used a volume of 30 ml, and the results were satisfactory, with the patient's pain during the observation hours showing mild pain with a VAS score of 1-2, and no rescue opioids were needed. This aligns with the above-mentioned study, indicating that FICB is an excellent analgesic and does not require opioid rescue.[14]

In line with the above theory, the patient in this case has geriatric comorbidities. In geriatrics, complications from bed rest are highly linear, with muscle mass and functional strength decreasing significantly more than in younger adults within just 72 hours of immobilization. Respiratory physiology has already declined, and the supine

position can negatively impact breathing, such as reducing functional residual capacity (FRC), decreasing diaphragm muscle strength, causing it to move cephalad, and reducing thoracic volume. There are also disturbances in cardiac baroreceptors, which can lead to orthostatic hypotension, causing syncope or presyncope, and impairing cardiac compensatory ability.[16]

In geriatrics, perioperative patient strategies must be carefully considered, and the choice of anesthesia technique must be appropriate. In this patient, we used neuraxial anesthesia, which, as we know, has benefits in geriatrics such as reducing mortality and morbidity, lowering the risk of thromboembolism, stress response, and postoperative delirium. As mentioned in the study by Al Harbi et al. (2023), the use of neuraxial anesthesia in geriatrics enhances safety and effectiveness, thereby improving outcomes.[17]

Compared to intravenous analgesics, FICB can improve postoperative pain control. In geriatrics, the incidence of PONV increases by 50% in the age range of 60-80 years. The use of opioids like morphine in hip surgery can potentially cause PONV by 30%. This can be reduced with the use of FICB. In this case report, FICB was performed as a postoperative pain management strategy for a geriatric patient undergoing hip surgery, and no symptoms of PONV were found. This aligns with the theory that the use of FICB has the advantage of not causing PONV.

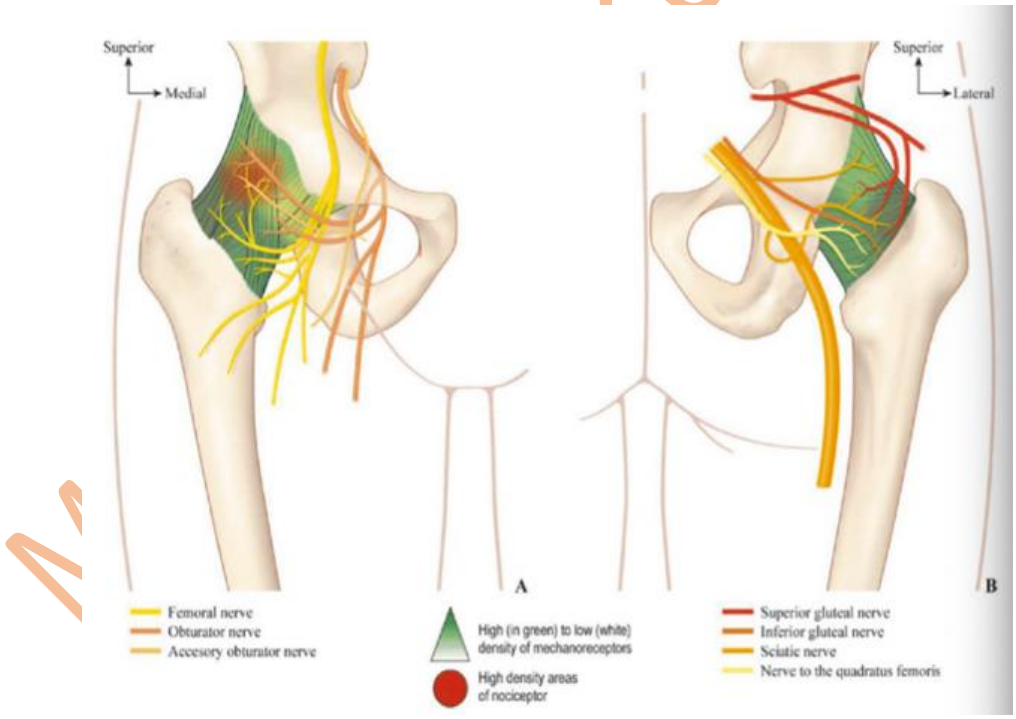

Figure 5. Hip joint sensory and innervation.(15)

CONCLUSION

Many studies have proven that peripheral nerve blocks (PNB) provide excellent postoperative analgesia and reduce complications from immobility due to unmanaged pain. In hip surgeries, which are highly associated with geriatric patients, FICB is highly recommended as it can reduce various risks such as postoperative nausea and vomiting (PONV), deep vein thrombosis (DVT), impaired ambulation, and delayed mobilization. This case report also shows that the use of FICB for postoperative pain management in geriatric hip surgery has minimal side effects with good analgesic effects. With this pain management modality, it is hoped that complications, especially in geriatric patients, can be reduced.

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