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Case Report

Ultrasound-Guided Fascia Iliac Compartment Block Anesthesia for Analgesia in Elderly Hip Fractures

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Abstract

Objective: To investigate the effect of ultrasound-guided iliac fascia analgesia on hip fracture in senile patients. Methods: Preoperative and postoperative ultrasound-guided iliac fascia analgesia was performed in elderly patients with hip fracture. Results: The need for additional analgesics after implementation was recorded. Conclusion: Ultrasound-guided fascia iliac analgesia is feasible, safe and effective in elderly patients with hip fracture.

Keywords: ***Ultrasound-guided, fascia iliac block, anesthesia hip fracture***

Introduction

Hip fracture is one of the common osteoporotic fractures in the elderly. As the population continues to age, number of such patients will surely increase. Hip fractures are often very painful and management is difficult because of the patient's advanced age and frequent multiple comorbidities. Effective pain management is associated with improved functional outcomes [1]. Preoperative and postoperative analgesia is an important part of pain management in elderly patients with hip fracture during the treatment. Although opioids and non-steroidal anti-inflammatory analgesics are the commonly used in the clinical analgesics. However, patients with advanced age are susceptible to many of their side effects including respiratory depression, hypotension, altered mental status and nausea and constipation [2]. Non-steroidal anti-inflammatory drugs increase the risk of bleeding and can exacerbate existing gastrointestinal issues, while acetaminophen alone is usually insufficient. Oral administration is limited by gastrointestinal problems in elderly patients.This makes the analgesic effects of opioids and non-steroidal anti-inflammatory analgesics difficult to achieve. Local nerve block analgesia may be an alternative to oral analgesia. The application of fascia iliac compartment block (FICB) has been already reported [3,4]. Peripheral nerve blocks are commonly placed by anesthesia prac-titioners following hip surgery as part of a multimodal pain management program. This method require less opioids and achieve quicker recovery. This reduced the need for additional analgesics and decreased the incidence of adverse systemic events, while not posing significant risk to the patient [5,6].

Fascia Iliac compartment block

Fascia Iliac compartment block(FICB) is a relatively simple technique and can be used as a complement to femoral nerve or lumbar plexus block. The mechanism of action is that the femoral nerve and the lateral femoral cutaneous nerve lie below the fascia iliac. Therefore, a sufficient amount of local anesthetic is injected under the fascia iliac, and the two nerves can be reached by volume diffusion of the local anesthetic under the fascia iliac. In the traditional block technique, the needle is inserted into the middle third of the area between the anterior superior iliac spine and the pubic tuberculum, and a double sense of breakthrough occurs when it passes through the fascia lata and the fascia iliac. The position of the needle tip is judged by this "sense of breakthrough". However, the success rate of blockage based on the sense of breakthrough cannot be guaranteed. Ultra-sound guided (USG) visualization of needle position and local anesthetic diffusion ensures that local anesthetic is injected in the correct location.

The extent of fascia iliac block(FIB) depends on the extent of local anesthetic diffusion and the nerve blocked. Femoral nerve block can block the medial front thigh and skin sensory block the medial leg and foot. Femoral nerve blocks also block the articular branches of the hip and knee joints. The lateral femoral cutaneous nerve supplies the anterolateral cutaneous sensation of the thigh.

The anatomy under ultrasound

The fascia iliac lies in front of the iliac muscle of the pelvis, rising from the upper lateral side of the iliac crest and coming inward to join the fascia of the psoas major. The femoral nerve and the lateral femoral cutaneous nerve lie below the fascia iliac in the pelvic segment. The anatomical location is the same as that of the femoral nerve: the femoral artery is first located from the groin level. If not immediately visible, move the probe inward and outward until the blood vessels are visible in the image. Immediately lateral and deep

to the femoral arteriovenous vein is seen a hypoechoic tissue the iliopsoas muscle. The iliopsoas muscle is covered by a thin layer of connective tissue called fascia that separates the muscle from the subcutaneous tissue on the surface. The highly echoic femoral nerve lies between the iliopsoas muscle and the iliofascia, lateral to the femoral artery. The fascia lata is more superficial. Moving the probe outward reveals the sartorius muscle, which is covered by its fascia, which is also part of the fascia iliac. The probe moves out again and we can see the anterior superior iliac spine.

Operational approach

The patient was placed in a supine position, the puncture site was disinfected and covered with a towel. The ultrasound probe was placed in a position showing the femoral artery, iliopsoas, and iliofascia simultaneously, and the probe was moved outward slightly until the sartorius muscle was revealed. There is a breakthrough feeling when the fascia is punctured by acupuncture, and the fascia is broken on ultrasonography. After no blood was drawn, 1 ~ 2ml of local anesthetic was injected to confirm the location of the puncture needle. A well-placed injection shows that the local anesthetic pushes the fascia iliac outward and inward from the site of injection.

Fascia iliac block(FIB) requires a large dose and its success depends on the volume of anesthetics spread along the connective tissue space. The anesthetic diffusion was monitored under ultrasound. If the diffusion position was not suitable, the injection was stopped and the needle was re-inserted to adjust the puncture needle position before injection. Multiple injection facilitates full diffusion of local anesthetics. The result of iliofascial block should be a block of all the femoral nerves and most of the lateral femoral cutaneous nerves.

The ultimate goal is to place the puncture needle tip below the iliac fascia, approximately 3/4 of the way outside the line between the anterior superior iliac spine and the pubic tuberculum, and inject approximately 30 to 40ml of local anesthetic until the anesthetic is seen to spread outward into the anterior superior iliac spine and into the femoral nerve.

Case

Two patients with proximal femur fractures, male, 80 and 81 years old, underwent closed reduction and internal fixation for proximal femur fractures. They cannot be given oral and intravenous analgesics because of gastrointestinal and kidney problems. We performed ultrasound-guided iliac fascia analgesia before and after surgery. They were given lidocaine (10 ml) and ropivacaine (20 ml) following the procedure described above. The analgesic effect is definite. They did not require intravenous or oral analgesics as assessed for pain for 3 days after performing ultrasound-guided fascia iliac block(FIB) analgesia.

Discussion

The average age of a hip fracture patient is approximately 80 years-old [1]. Twenty-four hours after hip fracture, 50% of patients who are greater than 50 years-old, report their pain as “severe or very severe” [7]. It is estimated that approximately 20% of hip fractures present with some level of dementia, [7] making the assessment of pain even more difficult. Ineffective pain management increases the risk of atelectasis, pneumonia, deep vein thrombosis, increased incidence of delirium and overall decreased function during hospitalization [8,9]. Kassam et al. Compared oral morphine usage in patients suffering proximal femur fractures who received a FIB compared to patients who took oral morphine alone. The authors found a significant reduction in pain scores in the FIB group and they required an average of 50 mg less of oral morphine [5]. The fascia iliaca blocks(FIB) can be easily mastered with training. Both emergency physicians and non-physician healthcare providers can safely place FIB with proper and brief instruction [10,11].

Summary

The use of ultrasound-guidance(USG) Fascia iliac block(FIB) in the preoperative and postoperative environments is a proven modality for analgesia elderly hip fractures. In addition to better analgesia, these procedures are safe and result in less side effects associated with traditional opioid medications. USG FIB is an important component of advanced analgesia for elderly hip fractures. Alternatively, collaboration with the in-house anesthesia team can be pursued to utilize advanced techniques for pain control.

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