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Case Report

A point-of-care ultrasound approach to fascia iliaca nerve block in a patient with a hip fracture ^{☆,☆☆}

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ABSTRACT

According to the Centers for Disease Control and Prevention, hip and femoral neck fractures are common fractures seen in older adults. Lower extremity nerve blocks are a tool available for pain control in these patients. One type of block that can be used in this type of fracture is the fascia iliaca compartment block. Clinicians sometimes do not utilize these blocks despite having been shown to produce better pain relief than a standard regimen of intravenous medications. We present a case of a 76-year-old female patient who had inadequate pain relief from intravenous medications. We illustrate the utilization of a standardized approach to a fascia iliaca compartment block using point-of-care ultrasound in the setting of a femoral neck fracture.

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Introduction

Hip and femoral neck fractures are common fractures seen in older adults [1]. Lower extremity nerve blocks are a tool available for pain control in these patients and are a preferred modality due to their efficacy and speed [2]. Nerve blocks can be rapidly performed by clinicians and have been shown to produce better pain relief than a standard regimen of

opiates, acetaminophen, and nonsteroidal anti-inflammatory drugs [2].

Multiple nerve block methods exist; one type of nerve block for pain relief in this type of fracture is the fascia iliaca compartment block (FICB). A FICB targets the femoral, lateral femoral cutaneous, and obturator nerves by injecting local anesthetic (typically amino amides such as ropivacaine) into the fascia iliaca compartment, which communicates with the lumbar plexus [3,4]. Risks of the procedure are rare but include

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block failure, local anesthetic systemic toxicity, nerve injury, hematoma, intravenous (IV) injection, and perforation of peritoneal cavity [5].

Point-of-care ultrasound (POCUS) is emerging as a useful tool to assist with procedural guidance, including regional nerve blocks, and previous studies have demonstrated that its use in FICB via the infra-inguinal approach increases the efficacy and decreases the potential for adverse events compared to traditional landmark techniques [5–8]. In this case, we present the utilization of a standardized approach to a FICB using POCUS in the setting of a femoral neck fracture in an elderly female patient.

Case report

A 76-year-old female with past medical history of hypertension and hyperlipidemia presented to the emergency department (ED) after a mechanical fall. She was walking into a fast-food restaurant on a rainy day, the handrail was wet, and she slipped, falling onto her left side. She was on the ground for about fifteen minutes before the ambulance arrived to transport her to the ED. She did not have head trauma and was not on anticoagulants. During transport the patient received a dose of 100 mcg of fentanyl IV by EMS. On arrival in the ED, she complained of severe pain in her left hip. On exam, the patient was in obvious discomfort with shortened left leg in comparison to the right with pain to palpation in the left hip. Medication was administered including ketorolac 15 mg and an additional dose of fentanyl 50 mcg IV just prior to X-ray for attempted pain control. Radiographic image (Fig. 1) revealed an acute, displaced, angulated, transverse fracture through the neck of the proximal left femur. The patient had continued uncontrolled discomfort and hydromorphone 1 mg IV was provided. She did not tolerate the medicine well as it caused significant nausea and emesis. Ondansetron 4 mg was given IV to help control her symptoms.

The provider discussed the risk, benefits, and alternatives of a FICB with the patient and she readily agreed and gave written consent for the procedure. The patient was kept in the supine position and the skin in the inguinal area was prepped with 2% chlorhexidine and standard sterile drapes. The linear ultrasound probe was affixed with a sterile probe cover. The skin was anesthetized with 1% lidocaine without epinephrine prior to the nerve block. Using the nondominant hand, the linear probe was placed parallel to the patient's inguinal ligament at the level of the inguinal crease with the indicator toward the patient's right. The physician scanned from lateral to medial identifying the femoral artery and vein just deep to the fascia lata. Medial to the femoral artery, the femoral nerve was identified just under the fascia iliaca (Fig. 2). Utilizing negative pressure, a 20-gauge 4-inch B. Braun Medical Inc echogenic spinal needle was inserted into the skin in the plane of the transducer until the tip was seen seated under the fascia iliaca. Once under the fascia iliaca, 1-2 cc of sterile saline was used to hydrodissect and confirm correct placement. The saline syringe was changed to a syringe of 30 mL of 1% ropivacaine and anesthetic was injected to bathe the femoral nerve (Fig. 3). The needle was withdrawn, and an adhesive bandage

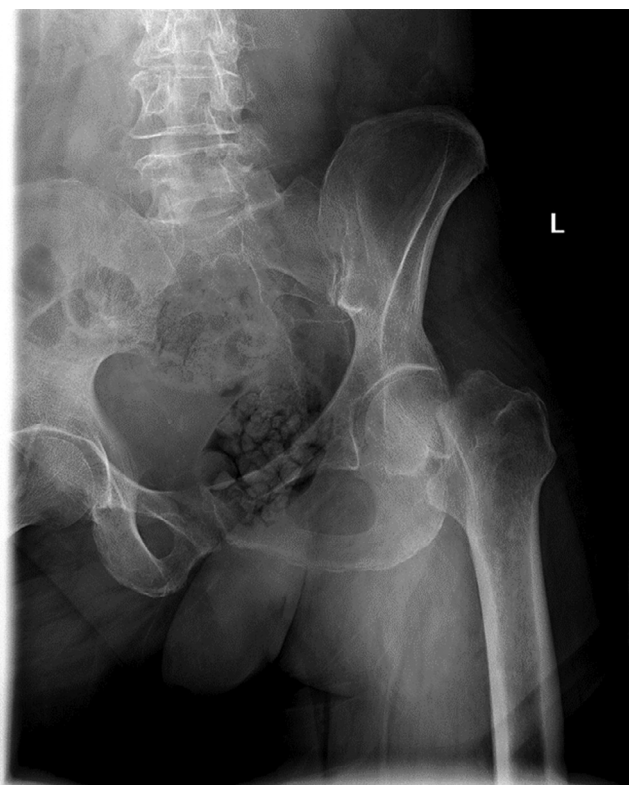


Fig. 1 – Acute, displaced, angulated, transverse fracture through the neck of the proximal left femur.

was placed on the puncture site. To prevent confusion or concerns regarding neurovascular checks for the patient after the nerve block, a skin marker is used to identify on the patient's leg the time and date of the procedure, the person who performed the procedure and the anesthetic used. The patient reported remarkable relief of her pain. She had a successful surgical repair and was discharged to rehabilitation facility on hospital day 6.

Discussion

Hip fractures are an unfortunately common injury pattern seen in the ED, accounting for 20% of fractures in the elderly population [8] and have a mortality rate of up to 30% one year after injury [2,9]. In the past, the only medical option acutely available to manage these fractures included opioids, acetaminophen, and anti-inflammatory pain medications. However, acetaminophen has often been ineffective in controlling pain alone, opioids often presented a risk for delirium, vomiting, and respiratory complications, and nonsteroidal anti-inflammatory drugs are often contraindicated in elderly patients who have higher rates of chronic kidney disease [10]. The emergence of ultrasound-guided peripheral nerve blocks, including FICB, has proven to be an early effective option for pain management in this vulnerable population [8,11–13]. In addition, multiple studies have shown benefits not only for

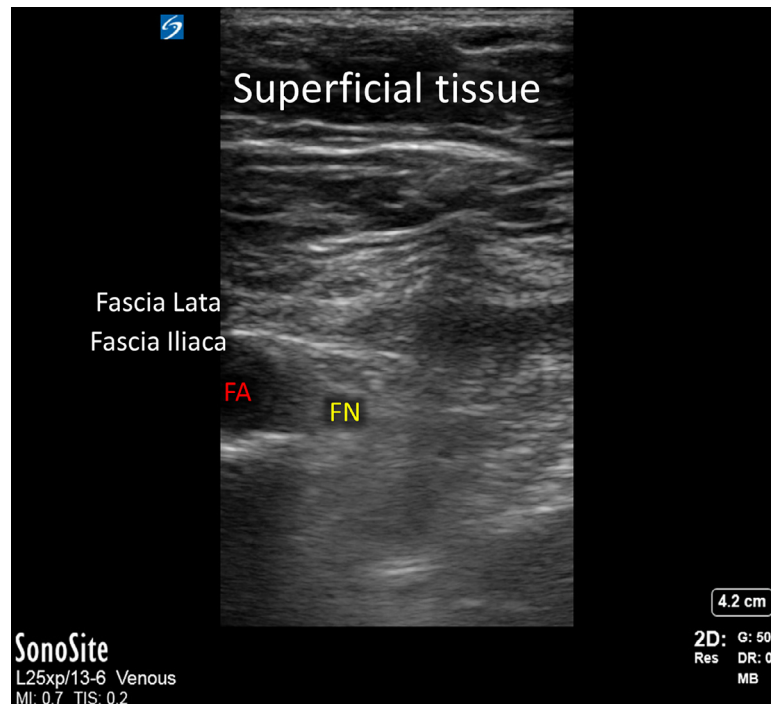


Fig. 2 – Landmarks identified using POCUS. Femoral artery (FA) and femoral nerve (FN).

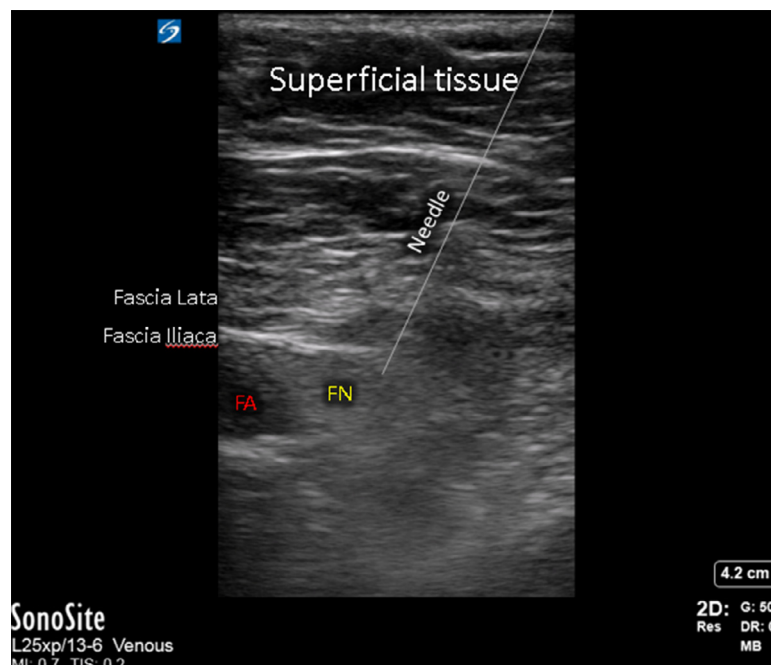


Fig. 3 – Fascia iliaca block.

pain control, but also highlighting improved sleep [8] and decreased use of opioids, [14,15] both known to contribute to delirium in elderly patients. Postoperative complications and mortality have also been shown to decrease with early analgesia from FICB [2,16].

Despite these numerous benefits, POCUS-guided FICB has not been widely adopted within EDs for pain control, which is

likely due to several barriers. The primary barrier for ED physicians is training, both with the procedure and with appropriate use of the ultrasound for guidance. There are numerous studies showing one-time training sessions can effectively educate physicians on how to use the procedure and implement it within practice [11–13]. Physicians also cite limitations of time on shift to perform the procedure and difficulty acquir-

ing appropriate materials or kits to perform the procedure in a timely manner as barriers. Other obstacles may include lack of protocolized procedure techniques, documentation requirements, and privileging, which will not be covered within this discussion as it has been reviewed in other articles and is unique to each specific facility.

Beyond barriers to completion, there are relatively few risks associated with the procedure. A 2021 study investigating ultrasound-guided nerve blocks in lower extremity surgery included 2597 patients and recorded zero anesthetic-related complications including infection, hematoma, paralysis, and nerve irritation [6]. Based on these experiences and evidence, FICBs appear to be a reliable, repeatable method to aid clinicians in the successful pain management of patients presenting with acute hip fracture. The authors hope that some of these barriers can be addressed by increasing familiarity of a standardized approach. The illustration of the technique in detail can be seen in the video (Appendix 1).

Conclusion

Proximal femur fractures are a common fracture seen in elderly patients. Typical medications used for pain control with these fractures often have high-risk side effects. The authors of this report contend that a FICB can be performed safely and effectively with POCUS for optimal pain control.

Patient consent

Written informed consent for this publication has been obtained from the patient.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2023.01.034.

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