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Pulsed Radiofrequency (PRF) of Pericapsular Nerves Group (PENG) in Chronic Hip Pain-A Case Report

Ashok Jadon
Department of Anesthesia & Pain Relief Service, Tata Motors Hospital, Jamshedpur, India

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Abstract

Pericapsular nerve group (PENG) block is a novel ultrasound (US)-guided block that is primarily used for acute pain management in the hip fractures. We report here a case where the PENG block was used for the chronic hip pain with adductor spasm due to hip osteoarthritis (OA). The PENG block with a combination of local anaesthetic and steroids provided an effective pain relief, however, only for shorter duration. After two attempts of the PENG block with local anaesthetic and steroids mixture, the pulsed radiofrequency (PRF) of the PENG was done, which provided the long-lasting relief. This report suggests that US-guided PRF of the PENG provides effective and prolonged pain relief in chronic hip pain of OA.

Keywords: Chronic pain, hip osteoarthritis, pain management, pericapsular nerve group block, pulsed radiofrequency treatment

Introduction

Pericapsular nerve group (PENG) block is a novel ultrasound (US)-guided block that is used to manage fractured hip pain, for positioning in spinal anaesthesia or to provide postoperative analgesia in hip surgery.[1] We report a case where PENG block was used for chronic hip pain due to osteoarthritis (OA) of hip. PENG block with a mixture of local anaesthetic and steroid provided effective pain relief, however, for shorter duration. After two such attempts of PENG blocks at the interval of 2 weeks, pulsed radiofrequency (PRF) treatment of PENG was done, which provided long-lasting relief.

Case Report

An 80-year-old male patient presented with right-sided hip pain, with complications of inability to walk and cord-like swelling in the right groin. He was on daily dose of oral pregabalin 75 mg, amitriptyline 10 mg, and tramadol 37.5 mg + paracetamol 325 mg twice daily. He often omitted the prescribed medicines due to dizziness and constipation. On examination, straight leg raising was normal; however, active and passive movements were painful more so on internal rotation and resisted hip abduction. There was persistent adductor muscle spasm that felt like a cord in the groin on palpation. No area of hypo or hyperesthesia was present. X-ray and computerised tomography scan of hip and spine showed bilateral hip joint OA, age-related degenerative changes in spine, and sacroiliac joints (Figure 1A). The working diagnosis of hip OA resulting in hip pain and spasm of adductor muscles was made. After obtaining an informed consent, the patient was taken to the procedure room. Intravenous access was secured; monitors for noninvasive blood pressure, pulse and oximeter were connected. With due to aseptic preparation and sterile technique, needle entry point was infiltrated with 2 mL 1% lidocaine, and PENG block was given with 20 mL 0.25% bupivacaine and 8 mg dexamethasone using the high-frequency (6-13 MHz) linear US probe (SonoSite-M Turbo®) and 100 mm 21G blunt tip needle (Stimuplex, B-Brown). After 30 minutes, patient reported good relief, adductor spasm disappeared, and patient was able to walk on his own with little discomfort and some residual pain. Good pain relief lasted for 10 days, and slowly over 3-5 days pain became of similar intensity. A repeat PENG block was given after 2 weeks, which resulted in excellent relief of symptoms. Adductor spasm

Corresponding Author: Ashok Jadon; E-mail: jadona@rediffmail.com

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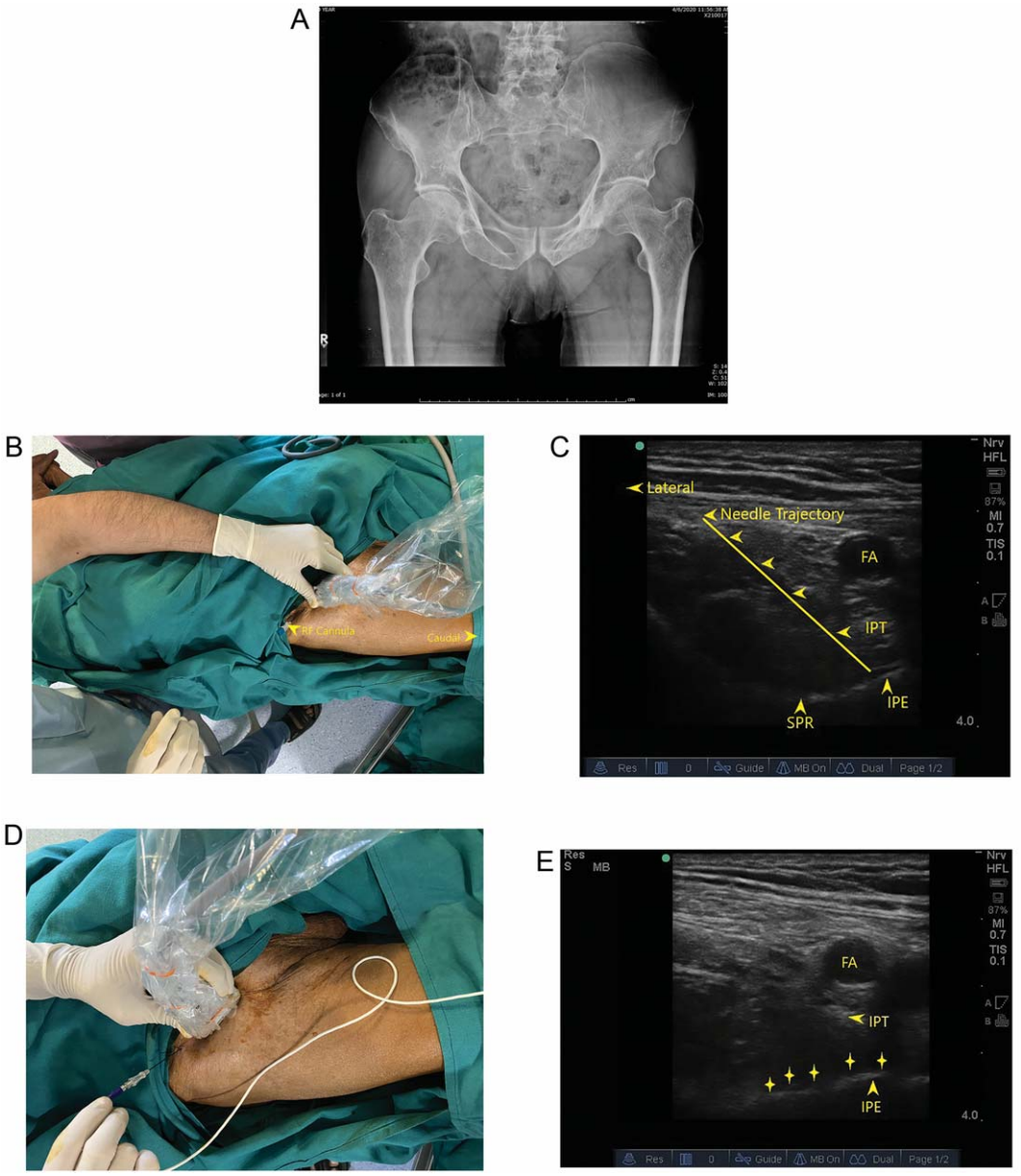

Figure 1. (A) X-ray of hip and spine showed bilateral hip joint osteoarthritis, age-related degenerative changes in spine, and sacroiliac joints. (B) 21G radiofrequency cannula was inserted in-plane using high-frequency linear ultrasound probe. (C) Cannula inserted until it contacted the superior ramus near iliopectineal eminence. (D) Radiofrequency probe inserted in cannula and PRF done after sensory stimulation. (E) Linear spread of local anaesthetic under the fascia of iliopsoas muscle. FA, femoral artery; IPE, iliopubic eminence; IPT, iliopsoas tendon; SPR, superior pubic ramus; – local anaesthetic spread.

Main Points

- Osteoarthritis (OA) is one of the leading causes of hip pain.
- Radiofrequency treatment of articular branches of hip joint provides long-term pain relief in OA.
- Pericapsular nerve group (PENG) block is primarily being used to manage acute pain from hip joint.
- Ultrasound-guided pulsed radiofrequency (PRF) of pericapsular nerve group (PENG) provides long-term pain relief in osteoarthritic pain from hip joint.

(cord-like feel in the groin) was disappeared. However, the deep joint pain was continuing, which resulted in limitation in walking and daily routine activity. Pulsed radiofrequency of PENG was done on right side in anticipation of prolonged relief of symptoms after 2 weeks from second injection. For PRF, similar technique as was used for previous PENG block was used. After skin infiltration with 2 mL 1% lidocaine, 21G radiofrequency cannula was inserted in-plane until it contacted the superior ramus near iliopectineal eminence (Figure 1B and C). Congruent sensory stimulation (crawling sensation with in the hip joint region) was noticed

at 0.6 mA. PRF was done with three cycles of 180 seconds each, and after each cycle, cannula was moved a mm medially (to cover large area/lesion size) keeping needle in contact with bone. After PRF, a 10 mL 0.25% bupivacaine mixed with 20 mg triamcinolone was injected (Figure 1D and E). Cannula was removed, and puncture site was cleaned and dressed. Patient was discharged after 1 hour of observation. On numeric score of 0-10 (0 = no pain and 10 = severe pain), patient reported 0/10 pain on rest and 2/10 on walking. Analgesic drugs, pregabalin, and tramadol were continued for 2 weeks. Patient was contacted over phone after 1 week, 3 weeks, and after 6 weeks. Patient reported excellent relief of symptoms and is still symptom free. He did not require prescribed medications and consumed only six tablets of ultracet (tramadol + paracetamol) over 6 weeks period.

Discussion

OA of hip joint is one of the leading causes of hip pain in old age patients.[2] Nerve blocks and radiofrequency treatment (radiofrequency ablation and PRF) of the nerves suppling the joint (articular branches) have been used to provide pain relief in chronic hip pain of OA.[3–5] These minimally invasive interventions provide short-term to long-term pain relief in the situation where surgery is not feasible.[6,7] Previously, the fluoroscopic-guided approach was a commonly used technique; however, now, US is becoming popular as it is devoid of harmful radiation.[8] A combination of fluoroscopy and US increases the safety and efficacy, where relatively large size cannulas are used to create larger lesioning.[9] In the present case, we used PENG block with local anaesthetic and steroid twice before PRF. The pericapsular branches can easily be blocked by local anaesthetic solution during PENG block. However, as previous cadaveric research has shown that the nerves are consistently present at almost fixed anatomical area, we used PRF to provide prolonged relief.[10] The location of nerves can further be confirmed by sensory stimulation before PRF.[3–7] PRF is a non-neurolytic lesioning method for pain relief and can relieve pain without evidence of neural damage.[10,11] Many theories have been proposed about PRF to provide prolonged pain relief. A popular theory is that the rapidly changing electric fields produced by PRF alter the transmission of pain signals via a pathway involving c-fos gene expression.[12,13] This expressed c-fos gene encourages the formation of preprodynorphin and results in an increased production of endorphin that modulates analgesic action, which may cause a prolonged analgesic effect.[14] However, the exact mechanism that how PRF provides prolonged pain relief is still not well understood.[12] Groin and medial thigh pain often arise from the articular branches of the obturator nerve. The pain-relieving interventions for hip also target obturator nerves.[5,6] However, we only performed PRF for branches of femoral and accessory obturator nerves. Because adductor spasm was disappeared after injection of local anaesthetic and steroid mixture during previous PENG blocks.[15] To conclude, PENG block using local anaesthetic and steroid can be used to manage the chronic hip pain for short duration. PRF of the articular branches during PENG block provided prolonged pain relief in chronic hip pain due to OA.

Informed Consent: Verbal informed consent was obtained from all participants who participated in this study.

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