Peripheral Nerve Stimulator for Obturator Nerve Entrapment with Fluoroscopic and Ultrasound Guidance: A Case Report

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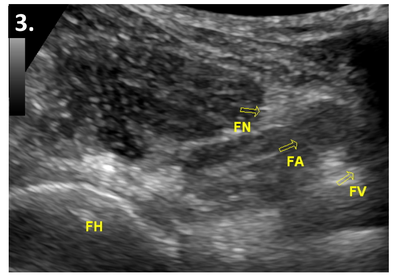
INTRODUCTION

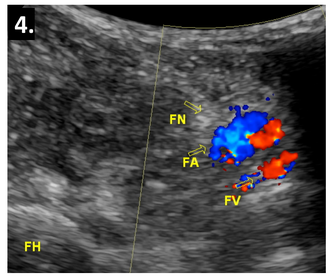
A 29-year-old mal presented with chronic right groin pain. Multiple hip injections, arthroscopy, and multimodal medications failed to alleviate his pain. He continued to have burning/sharp pain in his right groin. After successful diagnostic obturator nerve blocks, we proceeded with obturator nerve stimulator placement. The peripheral nerve stimulator was implanted using a combination of both fluoroscopic and ultrasound guidance. This implantation technique utilizes the benefits of each modality and minimizes their limitations, thus allowing for a safer and more precise procedure.

METHODS

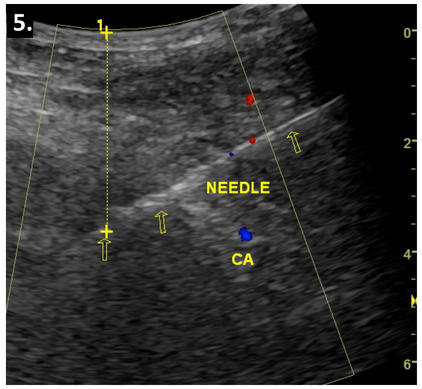
With the patient supine, the area over the groin was first evaluated utilizing fluoroscopy to localize the obturator nerve where it exits the pelvis into the thigh, previously described as the radiographic "teardrop" (Figure 1)[i, ii]. Then, ultrasound guidance safely identified the femoral nerve, artery, and vein (Figure 2, 3, 4). The probe position placement was marked on patient. First, needle was inserted in-plane aimed at the target at a depth under the neurovascular bundle. Also visualized here was the circumflex artery (Figure 5). Once the needle was safely underneath the neurovascular bundle we switched to fluoroscopy guidance to direct the needle further towards the obturator foramen (Figure 6). Then, nerve stimulation produced paresthesia in symptomatic area (Figure 7, 8). Once location was confirmed, the electrode was tunneled and procedure completed utilizing a single-incision technique (Figure 9, 10). Post implantation, final lead placement of peripheral stimulator (StimRouter^{tm}, Bioness) was visualized with fluoroscopy (Figure 11).

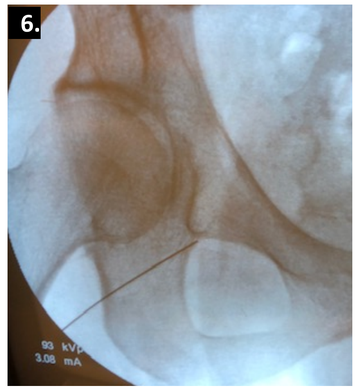
Combined Fluoroscopic and Sonographic Imaging

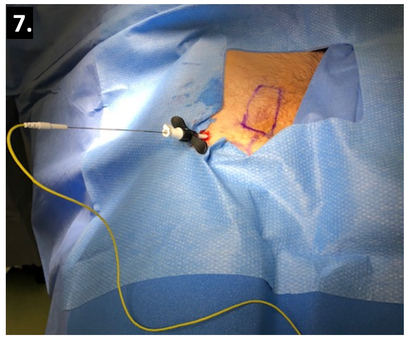




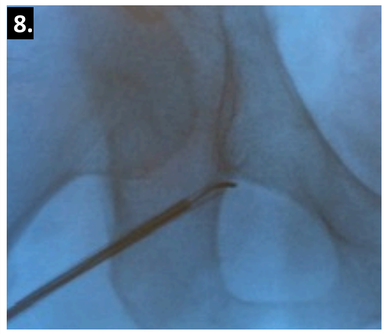
Caption: (1.) Fluoroscopy to identify obturator nerve where it exits the pelvis. (2.,3.) Ultrasound identifies neurovascular structures: femoral nerve (FN), femoral artery (FA), and femoral vein (FV); as well as the femoral head (FH). (4.) Doppler.

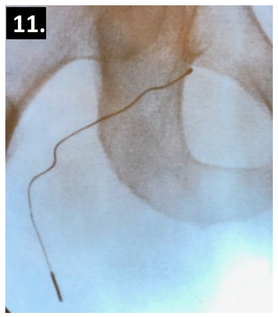






Caption: (5.) Ultrasound with needle inserted in-plane aimed at the target depth under the neurovascular bundle and above the circumflex artery (CA). (6.) Fluoroscopic guidance to direct needle towards obturator foramen.
(7.) Stimulator placed through dilator.





Caption: (8.) Fluoroscopy to confirm electrode placement. (9.) Single-incision technique.
(10.) Small single incision. (11.) Post-operative fluoroscopic image of stimulator.

RESULTS

Conventional lead placement generally relies on either fluoroscopic or ultrasound guided techniques. This technique describes a dual approach of fluoroscopic and ultrasound guidance for the treatment of rare obturator nerve entrapment. The patient underwent the procedure without any issues and has reported good pain relief and satisfaction with the procedure. Peripheral nerve stimulation (PNS) is a useful treatment for chronic neuropathic pain. This case report describes a peripheral nerve stimulator placement for refractory groin/medial thigh pain at the inferomedial acetabulum. Medial thigh pain and groin pain are often difficult to diagnose due to the various structures that are passing through the region. Previous studies report that the obturator nerve is responsible for innervation to the anterior hip capsule [iii,iv,v].

CONCLUSION

This technical case report demonstrates the feasibility of a single-lead, implantable peripheral nerve stimulation system through a single less than 1 centimeter incision for refractory groin pain secondary to obturator nerve entrapment at the inferomedial acetabulum, while also highlighting the dual utilization of fluoroscopy and ultrasonography.

REFERENCES

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