Case Report

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Challenges of Peripheral Nerve Stimulator Implantation in a Patient with New Onset Thrombocytopenia

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Abstract

Interventional procedures in the setting of multimodal practice are an often used treatment approach to chronic pain. Advanced technologies such as neuromodulation by way of peripheral nerve stimulation (PNS) is a promising frontier. Patients offered this technique have often failed conservative management, a series of injections and are not favorable candidates for pursuing spinal cord stimulation (SCS). A major goal for chronic pain treatment is the improvement of quality of life, return to work and activity. The spectrum of clinical situations where PNS has been successfully used includes chronic pain in extremities, neck, lower back, chest and abdominal wall, and head and face regions. It is also a widely accepted technique in the management of postsurgical neuropathy. We present a patient with complex regional pain syndrome (CRPS)-like symptoms of the lateral femoral cutaneous nerve after laparoscopic hysterectomy who underwent successful ultrasound-guided PNS trial using SCS leads and unfortunate delayed implantation due to thrombocytopenia. From this case we learned the following: positioning for laparoscopic hysterectomy may not be a readily attributed etiology for injury to the lateral femoral cutaneous nerve amongst some nonsurgical specialties; PNS is a viable option where SCS use is unfavorable; the use of spinal cord stimulator leads are useful in PNS trials, but may be less desirable for long term therapy; institution of basic coagulation screening at the time of trial rather than implantation in low risk candidates remains controversial.

Keywords: Peripheral nerve stimulator; Thrombocytopenia; Lateral femoral cutaneous nerve injury; Laparoscopic hysterectomy; Intraoperative nerve injury; Neuromodulation; Complex regional pain syndrome

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Introduction

The patient to be discussed in this case report reviewed the report and provided written consent for its use. Peripheral nerve stimulation is a successful neuromodulatory intervention for the treatment of chronic pain. Although SCS is more widely researched and applied, PNS is used in a variety of disorders such as limb mononeuropathies, CRPS, cranial neuralgias, headache disorders and regional pain not amenable to SCS [1-3]. One of the goals for patients who undergo successful trial and implantation of peripheral nerve stimulators is an improvement in their quality of life. This case describes successful trial of lateral femoral cutaneous peripheral nerve stimulation complicated by newly diagnosed thrombocytopenia at a multimodal pain management center.

Case Report

SH is a 43-year-old woman who presented to our multimodal pain management clinic February 2013 with a history of rheumatoid arthritis, fibromyalgia, and unresolved left anterolateral thigh pain after laparoscopic hysterectomy in July 2012. She was previously managed in 2005 at our clinic for rheumatoid arthritis and fibromyalgia pain, but was lost to follow up. Her pain was described as 10/10 intensity on a numerical rating scale and located in the left anterolateral thigh with radiation to the foot. The pain was characterized as constant, stinging, burning, and electric sensation. There were no associated symptoms. Exacerbating factors include activity, walking, and temperature changes and she denied alleviating factors. Effects on daily living and mobility included frequent awakenings during sleep, ambulation with cane assistance and interruption of many activities of daily living.

Past medical history includes rheumatoid arthritis, hypertension, fibromyalgia, nephrolithiasis, anxiety and COPD. Her past surgical history is significant for hysterectomy in 2011 and kidney stone removal. The patient is married, has 4 children, 13 pack year smoking history, denied alcohol and illicit drug use. She receives disability income, denied litigation and her highest level of education is the ninth grade. The patient reported a good support system consisting of her nuclear family.

On exam she was noted to be ambulatory with cane assistance. Initial exam findings of the left lower extremity revealed hyperalgesia of the left anterior thigh and normal sensation otherwise. No allodynia and no color changes were noted. Electromyography/nerve conduction study completed August 2012 showed left lateral femoral cutaneous nerve dysfunction. Our differential diagnosis consisted of trochanteric bursitis, meralgia paresthetica, lumbar radiculopathy, femoral neuralgia and complex regional pain syndrome. The diagnosis of trochanteric bursitis is based primarily upon lateral hip pain with radiation down the aspect of the lateral thigh and neuropathic characteristics. Diagnosis of meralgia paresthetica is based upon pain radiation in the anterolateral aspect of the thigh, normal sensation of the leg and EMG/NCS evaluation. Lumbar radiculopathy is a less likely diagnosis, but considered due to complaint of pain radiating into the foot, weakness on ambulation, pain characteristics and history of arthritis. CRPS on initial evaluation is considered due to disproportionate complaint of pain to initial findings.

Multimodal treatment was instituted and she was medically managed on gabapentin, duloxetine and lidocaine ointment as well as physical therapy and pain psychology. Due to her initial complaint of pain radiating to the foot, she was sent for lumbar MRI which revealed normal findings. She underwent left trochanteric bursa injection under fluoroscopy which she reported some pain relief and returned with 8 out of 10 pain. She described the pain as constant, sharp, shooting, stinging, burning type of pain. A diagnostic, ultrasound-guided left lateral femoral cutaneous nerve block was performed and 5 cubic centimeters of 0.5% ropivacaine was injected at the target. Her pre procedure pain score was 8 out of 10 and decreased to a post procedure pain score of 0 out of 10.

Since the patient had greater than 50% pain relief, she was scheduled for pulsed radiofrequency ablation of the left femoral cutaneous nerve and received injection of a therapeutic mixture of 5 mL of 0.25% bupivacaine and 40 mg of Kenalog post-ablation. The patient's pain score decreased from an 8 out of 10 to a 0 out of 10. The patient returned two months later with complaint of continued pain in the anterolateral part of the thigh. She described shooting and burning-type pain now with severe allodynia and hyperalgesia.

Since she had no sustained relief from left lateral femoral cutaneous nerve block, pulsed radiofrequency ablation, had normal findings on lumbar MRI and failed conservative therapy, she was considered for left femoral nerve block to rule out concurrent femoral neuralgia. With the progression of symptoms and ruling out of other causes, the IASP diagnostic criteria of CRPS was also considered as criteria being nearly met (displayed sensory and motor component on initial evaluation, reported sensory changes, no better medical explanation found) [4]. The patient was offered the option to proceed with femoral nerve block versus neuromodulation trial. She opted for femoral nerve blocks to rule out femoral neuralgia and a series of three ultrasound guided left femoral nerve blocks over the course of several months was performed with 15 cubic centimeters of 0.5% ropivacaine at each procedure. The left femoral nerve blocks decreased her pain from 10 out of 10 to 5 out of 10, transiently.

Approximately three months later, the patient returned for consideration of neuromodulation therapy. During the process of informed consent, the options of SCS versus PNS were discussed. The patient desired PNS due to anxiety over spine-related procedures and desire to limit radiation exposure. She was scheduled for a five day peripheral nerve stimulator trial after psychological clearance. Laboratory workup was deferred due to lack of clinical history warranting concerns regarding hemostasis. We performed peripheral nerve stimulator trial of leftsided femoral, anterior thigh peripheral nerve stimulation using a 16 contact trial Boston Scientific lead placed under ultrasound guidance with fluoroscopic confirmation. Stimulation testing was performed and only captured stimulation locally at the left thigh anteriorly (~L4 dermatome) and no stimulation was felt by the patient below the knee. The lead was then connected to the Boston Scientific device and the patient reported appropriate coverage of stimulation. The procedure was well tolerated by the patient. No complications were noted. She continued to do well in the recovery room with improvement of her pain score and symptoms. The patient reported 80 to 90% pain relief from the peripheral nerve stimulator; however, during preoperative workup for implant she was found to have thrombocytopenia and implantation was deferred for further workup by a hematologist.

Discussion

Chronic intractable neuropathic pain can be debilitating to the patient and pose a challenge for the pain physician. An anticipated, but uncommon peripheral nerve complication of lithotomy position for laparoscopic hysterectomy is ischemic injury to the lateral femoral cutaneous nerve due to compression by the inguinal ligament. This complication may not be readily attributed to the operative positioning amongst some nonsurgical specialties. Timely diagnosis of chronic neuropathic pain, referral and treatment could result in earlier institution of neuromodulation particularly in complex regional pain syndrome [5]. The early frustrations with patient selection criteria and equipment difficulties have diminished secondary to carefully controlled studies and improvements in equipment designs. Efficacy studies consistently show an overall 50% improvement in long-term pain control in patients who have failed conservative or other invasive modalities [6].

In the patient discussed, a series of interventions in combination with medications failed to bring long standing relief and neuromodulation was considered. While it may be argued that SCS is more widely used, patients offered PNS have often failed conservative management, a series of injections and are

not favorable candidates for pursuing spinal cord stimulation (SCS). Peripheral nerve stimulator trials using SCS leads under ultrasound guidance for placement allows for sensory and motor testing whereas motor testing for open neurosurgical approach involves a wakeup test. Another advantage for using SCS leads for field block is the decreased risk of mechanical nerve injury as seen with flat surgical plate electrodes [7,8].

Additional advantages to using ultrasound versus fluoroscopic techniques for placement include limited to no radiation exposure and visualization of soft tissue and critical vascular structures. Despite the usefulness of SCS leads for PNS trials, their use may be less desirable for long term therapy.

After successful trial, the patient was found to be thrombocytopenic and surgical implantation was delayed. Some evidence has been published regarding noncardiac surgery showing platelet count abnormalities found in the course of routine preoperative screening are associated with a higher risk of blood transfusion and death [9]. Due to the elective nature of the procedure, the discussion regarding risks and benefits related to preoperative coagulation screening in clinically low risk individuals resurfaced. The controversial decision for such screening remains a decision best clarified in hindsight.

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