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Case Reports

Peripheral Nerve Stimulation for the Treatment of Meralgia Paresthetica

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Meralgia paresthetica is a condition caused by entrapment of the lateral femoral cutaneous nerve at the level of the inguinal ligament. This nerve is a purely sensory nerve and provides innervation to the anterolateral portion of the thigh. The condition can lead to numbness, paresthesia, dysesthesia, and pain over the anterolateral aspect of the thigh, which are exacerbated with walking, standing, and hip extension. First-line treatment for MP includes conservative measures such as weight loss and eliminating tight-fitted clothing. Neuropathic pain medications and corticosteroid injections are also treatment options for some patients with significant pain complaints. In more refractory cases, surgical intervention can be considered. Peripheral nerve stimulation has also been shown to be a helpful treatment modality for patients with refractory meralgia paresthetica. Here we report our experience utilizing peripheral nerve stimulation in patients with significant pain complaints related to refractory meralgia paresthetica.

INTRODUCTION

Meralgia paresthetica (MP) is a condition caused by entrapment of the lateral femoral cutaneous nerve (LFCN) at the level of the inguinal ligament.[1] The LFCN is a purely sensory nerve that originates at the L2 and L3 spinal nerve roots and provides innervation to the anterolateral portion of the thigh.[1] Some causes of MP include obesity, pregnancy, pelvic masses, and external compression by tight-fitted clothing or belts.[2] In addition, MP can be caused iatrogenically after laparoscopic surgeries and orthopedic procedures involving the pelvis.[2] Risk factors for MP include obesity, diabetes mellitus, and older age.[1]

The incidence of MP is approximately 32.6 per 100,000 person-years.[3] It is typically diagnosed clinically with numbness, paresthesia, dysesthesia, and pain over the anterolateral aspect of the thigh, which are exacerbated with walking, standing, and hip extension.[4] Electrodiagnostic testing and ultrasound guided corticosteroid or local anesthetic injections can be used when the diagnosis is in question.[5] First-line treatment for MP includes conservative measures such as weight loss and eliminating tight-fitted clothing.[5] Neuropathic pain medications and ultrasound-guided corticosteroid injections are also treatment options for some patients.[5] In more refractory cases, surgical intervention with neurectomy and neurolysis can be considered.[5]

Peripheral nerve stimulation (PNS) has also been a helpful treatment modality for patients with MP.[6] Previously, PNS required more invasive surgery.[6] In recent years, technological advancements in neuromodulation have allowed for less invasive treatments for neuropathic pain syndromes.[6] PNS can now be done with image-guided lead placement near the nerve of interest without an extensive surgical procedure. Here we report a case in which the SPRINT PNS system was used to provide significant pain relief in a patient with MP. (SPRINT PNS System [SPR Therapeutics, Inc., Cleveland, Ohio]).

CASE DESCRIPTION

Our patient was a 47-year-old male who presented with numbness, dysesthesia, and pain over the anterolateral aspect of his left thigh exacerbated with walking and hip extension. The patient reported pain of 8/10 on a numerical rating scale. He underwent a lumbar spine MRI with no significant findings. The patient did not have diabetes but was obese with a BMI of 44. He tried stretching exercises, weight loss (30 pounds), discontinuation of belts and tight clothing, medication management, and injections. Another provider was previously managing the patient on opioid therapy as well as gabapentin. He was taking hydrocodone-acetaminophen 10mg-325mg every 4 hours along with gabapentin 800mg three times a day. The patient presented to our pain clinic on this regimen requesting further escalation of opioid pain medications. The patient was transitioned to pregabalin 100mg twice a day which offered no significant benefit. He then was offered a diagnostic left LFCN block which improved his pain by 80%. The patient consented to a SPRINT PNS lead placement at the LFCN.

The SPRINT PNS system is a temporary system that is placed for 60 days. The leads were subsequently removed, and the therapy was completed.

A linear ultrasound transducer was used to identify the left LFCN distal to the inguinal ligament. An in-plane approach was utilized to place the stimulating needle near the LFCN. After the stimulating needle exhibited optimal paresthesia coverage, a SPRINT PNS lead was placed at the site of stimulation coverage. The lead was secured to the skin with adhesive dressings, and the procedure was completed without complications.

The patient was seen in the clinic two weeks after the procedure and reported a 90% improvement in his pain scores. Additionally, at his one-month follow-up, the patient reported 100% improvement in his pain. The patient kept the device in place without issues for the entire 60-day treatment period. At his two-month follow-up appointment, the leads were removed without complications. The patient was again seen one month after his lead removal and reported an 80% improvement of his pain even after lead removal. The patient has reported significant satisfaction with the PNS procedure.

DISCUSSION

MP is a mononeuropathy of the LFCN, most commonly due to entrapment at the inguinal ligament. The condition typically causes numbness and paresthesia on the anterolateral aspect of the thigh, where the LFCN provides sensory innervation.[4] Though often successfully treated with conservative measures, MP can cause chronic pain and life-long flare-ups.[7] MP can cause severe pain and negatively impact a patient's quality of life.

MP is typically diagnosed clinically, but ultrasound, CT scan, MRI, and electrophysiological testing can be utilized for atypical cases.[8] History and physical exam can lead to diagnosis in most cases.[5] However, in cases where the diagnosis is less clear, imaging modalities can aid in diagnosis.[5] According to a case-control study conducted by Moritz et al., the LCFN may appear swollen or hypoechoic on ultrasonography in patients with MP.[9] Electrophysiological testing is considered the definitive standard for the diagnosis of MP because intact motor innervation can rule out root disease or polyneuropathies.[10] Other imaging tests such as MRI and CT scans are essential to rule out other medical conditions that may present as MP, such as lumbar disc herniation or tumors.[11]

Several treatment approaches for the treatment of MP include weight loss, loose-fitting clothing, neuropathic pain medications, neurolysis, neurectomy, and neuromodulation. Conservative measures such as weight loss and loose-fitted clothing should be considered first, as studies have shown them to effectively improve MP symptoms.[12] An analysis of 277 patients conducted by Williams et al. found that conservative treatment options successfully treated 91% of cases.[12] Another report of 150 cases with a 2-year follow-up found that 62% of patients treated with conservative measures had complete, sustained resolution of symptoms.[13] In refractory cases, other treatment options should be considered.

A Cochrane review by Khalil et al. in 2012 studied the efficacy of different treatment options for MP, ranging from conservative measures, nerve blocks to surgeries.[14] The systematic review found no randomized control trials on the treatment of MP.[14] Several high-quality observational studies showed that MP improved at comparable rates with local corticosteroid injections and surgical intervention (neurectomy and nerve decompression).[14] Neuromodulation with PNS systems has been proven effective in treating pain and function associated with neuropathies.[6] Our case demonstrates that the SPRINT PNS system can be utilized for refractory MP cases with significant improvement in pain scores without the need for invasive surgery or implanted permanent systems.

CONCLUSIONS

Neuromodulation with the SPRINT PNS system can benefit patients with MP that is refractory to conservative measures. The SPRINT device is temporary, implanted for 60 days, and then removed. The SPRINT PNS system provides sustained pain relief, even after removal, likely due to modulation of central sensitization. It is theorized that PNS modulates nociceptive input by stimulating non-nociceptive fibers, preventing the release of nociceptive neurotransmitters. PNS can modulate the perception of pain, allowing for prolonged pain relief. The SPRINT PNS system is a minimally invasive treatment for MP that is refractory to more conservative therapy.

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