PAIN MEDICINE CASE REPORTS

ISSN 2768-5152

Volume 10, Number 5, pp. 429-433

Temporary Percutaneous Lateral Femoral Cutaneous Nerve Stimulation for Surgically Refractory Meralgia Paresthetica: A Case Report

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Background: Meralgia paresthetica (MP) is a neuropathic pain syndrome resulting from lateral femoral cutaneous nerve irritation or injury. Patients who fail to respond to conservative therapies can find relief after interventions, including nerve blocks and decompression surgery, but some continue to experience pain. Temporary percutaneous peripheral nerve stimulation (PNS) is a minimally invasive option for targeted neuropathic pain management, though there is limited evidence of its efficacy in the management of MP.

Case Report: A 63-year-old man with MP unresponsive to conservative and surgical management underwent a 60-day percutaneous PNS trial. He experienced immediate and sustained pain relief (80%) with marked improvement in ambulation and sleep, which persisted at > 60% pain reduction 12 months after implantation.

Conclusions: Temporary percutaneous PNS may be an effective option for patients with MP refractory to conservative and surgical management.

Key words: Meralgia paresthetica, lateral femoral cutaneous nerve, peripheral nerve stimulation, SPRINT system, neuropathic pain, refractory pain, case report

BACKGROUND

The lateral femoral cutaneous nerve (LFCN) is a purely sensory branch arising from divisions of the L2 and L3 spinal roots. It supplies cutaneous sensation to the anterolateral thigh. LFCN irritation may result in meralgia paresthetica (MP), characterized by burning, tingling, numbness, or dysesthesia localized to the anterolateral thigh without motor deficits (1,2).

MP occurs in approximately 3.2 to 4.3 people per 10,000 person-years, with increased prevalence among those with diabetes, obesity, or prior pelvic and spinal surgery. (3). Although mechanical compression, metabolic neuropathy, and iatrogenic damage account for many cases, a significant proportion of MP has no clear etiology identified (4). Regardless of etiology, conservative treatments, including weight reduction, avoidance of tight clothing, and pharmacologic agents, such as tricyclic antidepressants, gabapentinoids, and topical lidocaine, are first line (1,3). When these measures fail, interventional strategies, including local anesthetic/corticosteroid injections, radiofrequency ablation, or surgical decompression, are considered (1,3,5). However, these more invasive strategies are not always curative. Temporary percutaneous peripheral nerve stimulation (PNS) is a minimally invasive option for targeted neuropathic pain management that could offer benefit for patients with medically and surgically refractory MP.

PNS has become increasingly utilized for the manage-

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Disclaimer: There was no external funding in the preparation of this manuscript.
Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.
Patient consent for publication: Consent obtained directly from patient(s).
This case report adheres to CARE Guidelines and the CARE Checklist has been provided to the journal editor.
Accepted: 2026-02-04, Published: 2026-07-31

ment of chronic neuropathic pain syndromes (6,7). As a minimally invasive, temporary approach, percutaneous PNS involves electrical stimulation via a microlead placed adjacent to a target peripheral nerve (8). Analgesia is achieved through activation of afferent fibers, subsequently inhibiting nociceptive transmission through a gate-control mechanism. Longer-term changes in central pain processing may contribute to sustained pain relief after the lead is removed (9). Considering these mechanisms, and the growing use of PNS, several case reports have examined its application in MP.

Three case reports describe durable benefit following use of the SPRINT® PNS System (SPR Therapeutics, Cleveland, OH), a temporary percutaneous PNS system, in patients with MP refractory to medical management. Langford et al (10) reported complete pain resolution in an overweight patient who had failed opioid and gabapentinoid combination therapy. Garcia et al (11) also documented complete pain relief following a SPRINT trial in a patient whose MP was unresponsive to conservative treatment. Dalal et al (12) described an obese patient with MP refractory to weight loss, lifestyle changes, opioids, and gabapentin who achieved 80% improvement following a SPRINT trial. Minimal data exists tracking long-term outcomes for patients undergoing PNS for MP, and no data exists on PNS use for MP treated after failed surgical management.

We present the case of a 63-year-old man with medically and surgically refractory MP who, following a 60-day trial of PNS via SPRINT, continued to experience pain relief 12 months after device removal. Our case shows that percutaneous PNS trials can be considered as a minimally invasive and effective treatment strategy for patients with refractory MP.

Our case report describes the clinical management of a single patient and contains no personally identifiable information. In accordance with Columbia University policy, it does not constitute human patient research and is therefore exempt from Institutional Review Board review. Informed consent was obtained from the patient for the publication of all details in this case report.

CASE PRESENTATION

The patient is a 63-year-old man with a past medical history significant for type 2 diabetes, hypertension, hyperlipidemia, class II obesity, and chronic back and left lower extremity pain. His chronic back and left leg radicular pain originated from a 2002 workplace injury, which had been well controlled with a regimen of analgesics and a spinal cord stimulator. In 2023, after spontaneous onset of pain in the anterolateral aspect of the right thigh, he was diagnosed with MP. The thigh pain was described as intermittent, burning, and sharp, localized to the inferior anterolateral thigh, and was unresponsive to his existing pain management regimen, including pregabalin, amitriptyline, and etodolac. Pain limited his ability to walk long distances and to sleep. LFCN involvement was confirmed with temporary pain relief after administering a local anesthetic block to the nerve. He subsequently underwent a right LFCN surgical decompression that provided partial relief for 8 months, after which pain recurred. Ultrasound performed postoperatively revealed no scarring adjacent to the LFCN at its exit from the pelvis, medial to the anterior superior iliac spine. Given his continued pain, the patient was referred to our outpatient chronic pain clinic.

Upon presentation to our pain clinic 6 months following LFCN decompression, the patient reported 10/10 sharp, burning pain on the Numeric Rating Scale similar to his initial presentation. His exam was notable for hyperalgesia to light touch and pinprick over the proximal right thigh with otherwise normal motor function. Subsequent electromyography and nerve conduction study results were indicative of LFCN neuropathy. To confirm the diagnosis of LFCN neuropathy prior to consideration of PNS, a right LFCN block was performed under ultrasound guidance. After sterile preparation and local anesthesia, a 21G needle was advanced in-plane to the fascial plane between the sartorius and tensor fascia latae, where the LFCN was visualized. Following negative aspiration, 5 mL of injectate consisting of 4 mL of 0.25% bupivacaine and 40 mg of triamcinolone was administered. The procedure was well tolerated without complications. Postprocedurally, the patient reported complete resolution of pain for 5 days before recurrence. A 60-day trial of right LFCN PNS with the SPRINT system was then pursued.

To perform the procedure, the right femoral region was prepped with chlorhexidine and draped in a sterile fashion. Under ultrasound guidance, the right LFCN was visualized, and a 17G percutaneous sleeve with a 19G stimulating probe was advanced to 1 cm lateral to the nerve (Fig. 1). Stimulation elicited paresthesia overlapping the patient's area of pain. Once optimal positioning was confirmed, the probe was exchanged for a microlead introducer and lead, which was deployed and secured using 2-octyl cyanoacrylate and an occlusive dressing. The patient tolerated the procedure

well without complications and was discharged home the same day.

At his 2-week postoperative visit, the patient reported 75% pain relief and improved mobility. One-month postimplantation, he continued to experience pain relief, with an 80% to 85% reduction of his preimplant pain. At that time, he reported a transient recurrence of pain after stimulation was stopped when he misplaced his device remote, which resolved following remote replacement and resumption of stimulation. At 60 days postimplantation, the lead was removed without complication, with the distal tip confirmed intact. At the time of removal, the patient continued to report pain relief. Six weeks postlead removal, the patient continued to experience 80% sustained pain relief. At 12-month follow-up, the patient sustained functional gains and 60% overall pain improvement from baseline (Table 1).

DISCUSSION

Our report describes a 63-year-old man with medically and surgically refractory MP who experienced significant and durable pain relief following temporary ultrasound-guided LFCN PNS. Our report represents the first documentation of the successful use of the SPRINT PNS trial to achieve sustained improvement in pain attributable to MP following recurrence after initially successful local surgical decompression. The patient tolerated the PNS procedure well, experiencing durable improvements that lasted even after lead removal. These findings are consistent with previous reports showing that percutaneous PNS can be safe and effective to address isolated neuropathies (10-12).

The analgesic mechanisms of PNS are not yet fully understood, but several processes have been proposed. Stimulation of large-diameter nonnociceptive Aβ afferent fibers may inhibit transmission of pain signals by the smaller Aδ and C fibers at the dorsal horn via segmental gating (9). Additionally, PNS may modulate local inflammatory mediators and descending inhibitory control through serotonergic and dopaminergic pathways (9). Reduced central sensitization due to cortical reorganization might also play a role in the analgesic effect of PNS (9). By modulating inhibitory neurotransmission, dampening excitatory mediators, and altering activity in regions, such as the somatosensory cortex and anterior cingulate cortex, PNS could disrupt the pathological neural adaptations that maintain a sensitized state (9).

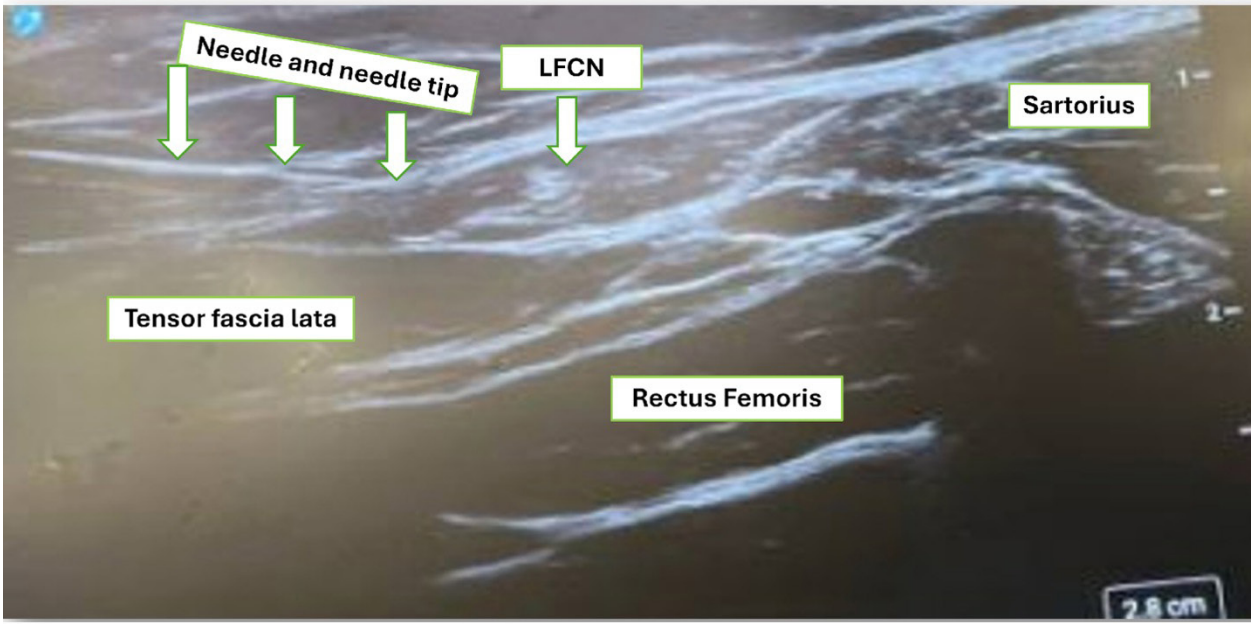

Fig. 1. Ultrasound-guided approach to LFCN PNS.
Ultrasound-guided in-plane approach to the right LFCN. A 17G percutaneous sleeve and 19G stimulating probe are advanced to approximately 1 cm lateral to the nerve, with stimulation adjusted to reproduce paresthesia in the patient's pain distribution before microlead placement.
Abbreviations: LFCN, lateral femoral cutaneous nerve; PNS, peripheral nerve stimulation.

Table 1. Timeline of response to SPRINT PNS trial.

Date	Pain Severity	Functional Status	Key Events
8/7/24	Prior to PNS placement, pain is 10/10 per NRS-11 at BL but improves with distraction	Limited ability to dress and make bed; decreased participation in PT/HEP	Right SPRINT PNS lead implanted
8/22/24	Patient reported 75% relief of pain BL (25% residual pain)	Improved dressing and making bed; subjective decrease in pain medication use; increased PT/HEP participation	Two weeks post-PNS; no adverse effects
9/19/24	Patient reported 80% to 85% relief of pain BL (15% to 20% residual pain)	Functional gains maintained; PT/HEP participation continues	Temporary loss of EPG, pain returned briefly; relief was restored after replacement
10/21/24	Patient reported 80% to 85% relief of pain BL (15% to 20% residual pain)	Functional gains maintained	Lead removal completed in office; distal tip intact; end of 60-day trial
12/4/24	Patient reported 80% relief of pain from BL (20% residual pain)	Functional gains maintained; no pain meds needed	Six weeks postlead removal
8/11/25	Patient reported 4/10 per NRS-11 pain, 60% improved from BL	Functional gains sustained; ambulation and sleep preserved	Twelve months post-SPRINT lead implantation; ongoing multimodal management

Abbreviations: PNS, peripheral nerve stimulation; NRS-11, Numeric Rating Scale; BL, baseline; PT/HEP, physical therapy/home exercise program; EPG, external pulse generator.

These central changes may explain why analgesia persists beyond the stimulation period. The improvement of our patient's pain during the SPRINT PNS trial and subsequent durability of his pain relief following lead removal is consistent with such sustained neuroplastic and central modulatory effects.

Our case report has several limitations. First, the temporary loss of the external stimulator may have influenced the total magnitude of relief observed during the trial. Second, as a single-patient report, generalizability is limited. Third, the patient previously underwent surgical decompression, raising the possibility that residual or synergistic effects contributed to his improvement. Lastly, had this patient's pain recurred after the close of his PNS treatment period, we could have considered a permanent PNS given the efficacy of the temporary device. Future studies involving larger cohorts are needed to clarify the durability, predictors of response, and comparative effectiveness of temporary PNS for MP.

CONCLUSIONS

Temporary PNS of the LFCN represents a minimally invasive treatment option capable of producing meaningful and durable pain relief in patients with refractory MP. This modality may restore function and quality of life even among individuals with complex pain histories or prior unsuccessful surgical interventions.

The sustained improvement observed in this patient 12 months after lead removal suggests that temporary PNS may induce lasting neuromodulatory effects. Additional prospective studies with larger cohorts are warranted to further evaluate long-term outcomes, optimal patient selection, and the comparative value of PNS relative to other conservative or surgical strategies.

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