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Novel Use of Temporary Percutaneous Peripheral Nerve Stimulation for Middle Cluneal Neuralgia: A Case Report

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Background: Cluneal neuralgia (CN) is an uncommon cause of low back pain that can be difficult to diagnose due to its nonspecific clinical features that often mimic other conditions. If left untreated, it can significantly reduce a patient's quality of life. The following case reports the successful use of percutaneous peripheral nerve stimulation (pPNS) for the treatment of middle CN.

Case Report: A 35-year-old man presented to our clinic for intractable low back pain that made it difficult for him to sit or lie down on his back. After failing multiple oral medications and procedural interventions, the patient underwent pPNS of the middle cluneal nerve. This reduced his pain significantly and allowed him to return to work as a rideshare driver.

Conclusions: For patients that fail conventional treatment, pPNS may be a viable alternative treatment for middle CN.

Key words: Cluneal neuralgia, middle cluneal nerve, percutaneous peripheral nerve stimulation, neuromodulation

BACKGROUND

Most cases of low back pain are nonspecific and often respond to conservative management (1). However, if symptoms persist, a broader differential should be considered. Cluneal neuralgia (CN) is a rare diagnosis that can be easily missed due to its similar presentation to more common conditions, such as lumbar radiculopathy or myofascial back pain. The cluneal nerves emerge from the dorsal and ventral rami of the thoracolumbar and sacral spine, providing sensory innervation to the buttocks and posterior parasacral region. There are 3 divisions consisting of the superior, middle, and inferior cluneal nerves that each innervate distinct regions. Depending on which division is affected, symptoms of CN can include low back pain, buttock pain, posterior thigh pain, pain with movement, sitting or lying, and tenderness along the iliac crest (2-4). Due to its nonspecific presentation, CN is best diagnosed via nerve block. Once a diagnosis of CN has been established, available treatment options include oral medications, hydrodissection, permanent peripheral nerve stimulation (PNS), radiofrequency ablation (RFA), or surgical release (5).

However, despite this wide array of treatment options, high-quality clinical research supporting their use is limited (6). Furthermore, the majority of the available literature focuses on superior CN, despite the fact that CN can occur in any of the 3 branches—superior, middle, or inferior. The following report describes the first documented case of a patient who was successfully treated for middle cluneal nerve neuralgia using temporary percutaneous PNS (pPNS).

CASE PRESENTATION

The patient is a 35-year-old man with no significant

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past medical history who presented to our clinic for intractable 10/10 low back pain that had progressed over the past 3 months. He described his pain as sharp, worse on the right side, and exacerbated by sitting, walking, and lying down to sleep. His symptoms had left him unable to sleep or perform his job as an Uber driver. Prior attempts to control his pain with medications, such as methocarbamol, baclofen, Toradol, ibuprofen, or lidocaine patches, were unsuccessful, and physical therapy was of limited benefit. He experienced temporary relief with bilateral sacroiliac (SI) joint injections, but when his pain returned, repeat injections had no effect. On physical exam, he demonstrated no remarkable findings apart from marked tenderness of the lumbar paraspinals. Magnetic resonance imaging of his lumbar spine did not reveal any significant pathology.

The patient initially underwent bilateral diagnostic nerve blocks of the middle cluneal nerves under fluoroscopic guidance using 0.5% bupivacaine. Following this procedure, he reported 100% relief of his low back and buttock pain in the immediate postoperative period. These results were consistent with middle CN. Given the success of his peripheral nerve block, the patient returned one month later to undergo pPNS placement via SPRINT® (SPR Therapeutics, Cleveland, OH) of the right middle cluneal nerve.

Within days of SPRINT lead placement, the patient began to feel significant relief. His pain decreased from 9/10 to 2/10, and he developed increased tolerance to prolonged sitting and ambulation. While at home, he utilized his stimulator consistently for approximately 10 hours per day, deactivating it only to sleep. At each of his monthly follow-up visits, the patient reported sustained analgesic benefit, with his pain never exceeding 4/10—even when the stimulator was turned off. After completing 60 days of pPNS, the patient underwent lead explantation, but continued to return to our clinic for routine follow-up. He continued to experience pain relief at 60 days postexplantation (120 days postinitial lead placement), reporting that he was able to sleep and sit without difficulty, and that he had since returned to his job as a rideshare driver without pain.

DISCUSSION

Middle CN, while rare, can be a source of debilitating low back pain that significantly interferes with patient function and quality of life. Understanding the anatomy of the middle cluneal nerves can provide insight into how these symptoms may arise.

The middle cluneal nerves commonly arise from the dorsal rami of L5-S4 nerve roots (7). These dorsal rami give off lateral branches that travel toward the posterior SI ligament before piercing the gluteus maximus muscle and aponeurosis. Finally, the terminal branches reach the skin directly underneath the posterior superior iliac spine, where they become the middle cluneal nerves and provide sensory innervation. Injury to the nerve along this pathway can result in pain in the middle CN distribution. Given the lack of surgery, trauma, or significant medical history in our patient, the most likely cause of his symptoms was entrapment of the middle cluneal nerve. Anatomical studies performed by Konno et al (8) suggest that the posterior SI ligament may be a common point of entrapment. In the study, out of 30 cadavers, the middle cluneal nerve was observed to be traveling beneath the long posterior SI ligament 10 times; 4 of these nerves demonstrated signs of gross visible compression at the point of intersection (8).

As with superior CN, conservative management of middle CN typically consists of physical therapy and oral medications, such as anticonvulsants (gabapentin and pregabalin), tricyclic antidepressants, serotonin-norepinephrine reuptake inhibitors, and nonsteroidal anti-inflammatories. However, the efficacy of these interventions is unclear, given that there are no large-scale trials assessing their effectiveness in patients with CN. Furthermore, these medications have side-effect profiles that may limit their use, especially in patients with comorbidities, such as renal or cardiac disease, history of gastrointestinal ulcers, or stroke.

Given these limitations and the localized nature of CN, clinicians often favor targeted interventional procedures as an alternative treatment. Popular treatment options include peripheral nerve blocks, RFAs, and PNS, though the therapeutic efficacy of these procedures has similarly yet to be substantiated by large, randomized trials. More recently, pPNS via SPRINT has emerged as an additional alternative. Until now, prior case reports and case series have described the efficacy of SPRINT therapy in patients with superior cluneal nerve neuralgia (9,10). Most recently, however, our patient's clinical course demonstrates the first reported case of the effective use of pPNS for middle cluneal nerve neuralgia.

Traditional PNS involves placing a temporary lead adjacent to the nerve of interest for 7 days, followed by permanent lead placement if the patient's pain responds well. These leads are thought to provide symptomatic relief via gate theory, which theorizes that stimulation

of larger and faster A-beta neurons leads to activation of inhibitory interneurons that intercept and inhibit nociceptive signaling from C fibers (11). Via SPRINT, pPNS functions similarly, but differs from traditional PNS in key ways. First is its open-coil lead design, which allows for tissue growth to enmesh within the lead, leading to greater security and lower rates of infection (12). Second is SPRINT's ability to generate larger, more homogenous electrical fields, which activate a greater percentage of nearby afferent fibers within the target nerve (12). And finally, as seen in our patient, SPRINT leads are temporary by design, providing durable and meaningful pain relief even after lead explantation (12). Deer et al (13) have proposed that the mechanism for this sustained pain relief may involve remapping of the somatosensory cortex. They theorize that consistent afferent nonnociceptive input has a "reconditioning" effect on the central nervous system, which alleviates not just the peripheral nerve injury, but the central sensitization effect that often occurs with sustained nociceptive signaling as well (14). This reconditioning effect offers an explanation for how our patient continued to experience substantial pain relief even after his SPRINT lead was removed.

Recent reviews (15) have found pPNS using SPRINT to be effective for multiple different pain etiologies, including hemiplegic shoulder pain, subacromial impingement, axial back pain, and neuropathic pain following amputation. As research efforts continue, clinicians will likely find that pPNS can be used to treat an even broader range of pain diagnoses. Our case demonstrates that pPNS can be an effective form of treatment for middle CN, one that may offer unique advantages over more common interventions. For example, the efficacy of traditional PNS, which requires permanent implantation, may be affected by stimulator damage or malfunction over the years; whereas, pPNS forgoes the need for implantation beyond 60 days.

In addition, prior studies (16) have found that pPNS was able to provide significant pain relief to patients whose axial back pain returned after receiving RFA, preventing them from having to repeat the procedure. If future research reveals similar benefits in CN, pPNS via SPRINT may emerge as an additional minimally invasive step in the treatment ladder for patients with persistent CN prior to surgery.

CONCLUSIONS

Middle CN is a rare cause of low back pain that, if left untreated, can cause significant and debilitating symptoms. Once a diagnosis has been established, multiple potential treatment options exist, including PNS, RFA, hydrodissection, or surgical release. However, the efficacy of these treatment options has yet to be established through large-scale randomized controlled trials. While further research is still needed, our patient's clinical course demonstrates that pPNS may serve as a minimally invasive alternative treatment option for patients with middle CN who may not be candidates or fail to achieve relief with these aforementioned interventions.

Consent For Publication

Informed consent was obtained directly from patient. The report does not include any identifiable patient information and is, therefore, exempt from Institutional Review Board review.

REFERENCES

1. Wirth B, Schweinhardt P. Personalized assessment and management of non-specific low back pain. *Eur J Pain* 2024; 28:181-198.
2. Paracha U, Hendrix JM. Cluneal neuralgia. In: *StatPearls [Internet].* StatPearls Publishing, Treasure Island, FL 2026. www.ncbi.nlm.nih.gov/books/NBK587348/.
3. Fujihara F, Isu T, Kim K, et al. Clinical features of middle cluneal nerve entrapment neuropathy. *Acta Neurochir (Wien)* 2021; 163:817-822.
4. Kuniya H, Aota Y, Kawai T, Kaneko K, Konno T, Saito T. Prospective study of superior cluneal nerve disorder as a potential cause of low back pain and leg symptoms. *J Orthop Surg Res* 2014; 9:139.
5. Anderson D, Szarvas D, Koontz C, et al. A comprehensive review of cluneal neuralgia as a cause of lower back pain. *Orthop Rev (Pavia)* 2022; 14:35505.
6. Desai MJ, Nepaul S. Cluneal neuropathy: Background, diagnosis, and treatment. *Pain Pract* 2023; 23:437-446.
7. Karl HW, Helm S, Trescot AM. Superior and middle cluneal nerve entrapment: A cause of low back and radicular pain. *Pain Physician* 2022; 25:E503-E521.
8. Konno T, Aota Y, Saito T, et al. Anatomical study of middle cluneal nerve entrapment. *J Pain Res* 2017; 10:1431-1435.
9. Mas D, Alessandro NM, Nisar F, Elsharkawy H. Peripheral superior cluneal nerve stimulation for intractable low back pain: Combined fluoroscopy and ultrasound technique, a case series. *Interv Pain Med* 2025; 4:100542.
10. Vu PD, Robinson CL, Kaye AD, Hasoon J. Stimulating superior

cluneal nerves via peripheral nerve stimulation as a treatment for chronic low back pain. *Cureus* 2024; 16:e51952.

11. Deer TR, Naidu R, Strand N, et al. A review of the bioelectronic implications of stimulation of the peripheral nervous system for chronic pain conditions. *Bioelectron Med* 2020; 6:9.
12. Ilfeld BM, Gabriel RA, Saulino MF, et al. Infection rates of electrical leads used for percutaneous neurostimulation of the peripheral nervous system. *Pain Pract* 2017; 17:753-762.
13. Deer TR, Eldabe S, Falowski SM, et al. Peripherally induced reconditioning of the central nervous system: A proposed mechanistic theory for sustained relief of chronic pain with percutaneous peripheral nerve stimulation. *J Pain Res* 2021; 14:721-736.
14. Campbell JN, Meyer RA. Mechanisms of neuropathic pain. *Neuron* 2006; 52:77-92.
15. Pritzlaff SG, Latif U, Rosenow JM, et al. A review of prospective studies regarding percutaneous peripheral nerve stimulation treatment in the management of chronic pain. *Pain Manag* 2024; 14:209-222.
16. Deer TR, Gilmore CA, Desai MJ, et al. Percutaneous peripheral nerve stimulation of the medial branch nerves for the treatment of chronic axial back pain in patients after radiofrequency ablation. *Pain Med* 2021; 22:548-560.