

Pulsed Radiofrequency Ablation for Treating Sural Neuralgia

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Background: Sural neuralgia is persistent pain in the distribution of the sural nerve that provides sensation to the lateral posterior corner of the leg, lateral foot, and fifth toe. Sural neuralgia is a rare condition but can be challenging to treat and can cause significant limitation. We present 2 cases of sural neuralgia resistant to conservative management that were effectively treated by pulsed radiofrequency ablation.

Case Reports: A 65-year-old female developed sural neuralgia after a foot surgery and failed conservative management. She had successful sural nerve blocks, and pulsed radiofrequency ablation led to an 80% improvement in her pain. A 33-year-old female presented with sural neuralgia secondary to two falls. The patient had tried several conservative modalities with no success. We performed diagnostic blocks and pulsed radiofrequency ablation, and the patient reported 80% improvement in her pain.

Conclusion: Pulsed radiofrequency ablation may be a safe and effective treatment for patients with sural neuralgia that does not respond to conservative therapy. However, studies are needed to elucidate its effectiveness and safety profile.

Keywords: Neuralgia, pulsed radiofrequency treatment, sural nerve

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INTRODUCTION

Sural neuralgia is pain caused by injury or inflammation of the sural nerve. The sural nerve, along with 4 other nerves, provides sensation to the foot. Specifically, the sural nerve provides sensation to the lateral posterior corner of the leg, lateral foot, and fifth toe. The sural nerve is superficial, predisposing it to injuries.¹ Common causes of sural neuralgia are direct trauma, external compression, vasculitis, and diabetes. A more concerning cause of sural neuralgia is sural nerve entrapment in which the sural nerve is entrapped by scar tissue that pulls and compresses the nerve, leading to pain. Sural nerve entrapment is a feared postoperative complication of many orthopedic procedures involving the ankle, such as Achilles tendon repair, ankle surgery, fifth metatarsal fracture surgery, and ganglion cyst removal.²

Sural neuralgia is a relatively rare condition and often responds to conservative treatments such as rest, physical therapy, massage therapy, antiinflammatory medications, tricyclic antidepressants, serotonin and norepinephrine inhibitors, gabapentin, and calcium channel blockers. Because sural neuralgia is rare and often responsive to conservative therapy, many clinicians have limited experience treating cases that are resistant to conservative therapy. This limited experience, combined with the paucity

of data regarding effective treatment modalities, makes treating patients suffering from sural neuralgia difficult. We describe 2 cases of sural neuralgia resistant to conservative therapy in which pulsed radiofrequency (PRF) ablation was used to achieve 80% pain relief at 2-month follow-up.

CASE REPORTS

Patient 1

A 65-year-old female presented to our clinic with pain and tingling in her right foot. Using the visual analog scale (VAS) in which 0 represents no pain and 10 represents the worst pain imaginable, she described her pain as 8/10 in severity and sharp in nature. The patient had developed the pain after excision of a large ganglion cyst from her right foot and a transverse metatarsal ligament release of the third interspace. The patient had tried physical therapy, nonsteroidal antiinflammatory drugs (NSAIDs), and gabapentin with no success. The patient experienced depression because of her inability to work, socialize, or perform any of her usual physical activities.

Physical examination showed that the patient had right sural neuralgia with pain and tingling in the course of the nerve. To further confirm the diagnosis, we performed a right sural nerve block using a local anesthetic, and the patient reported excellent relief of pain after the injection.

We decided to proceed with PRF ablation to provide long-term relief for the patient. At 2-month follow-up, the patient reported an 80% improvement in her pain, improvement in activity level, an increase in social activities and in hours of sleep, and a marked improvement in mood.

Patient 2

A 33-year-old female was referred to our clinic by her orthopedic surgeon because of a 1-year history of intermittent sharp left foot pain. The maximum severity of her pain was 6/10 on the VAS. Her pain first occurred suddenly while she was walking. Several providers had attempted to determine the underlying cause. The precise etiology was unknown but was thought to be related to previous falls that led to left knee and ankle trauma. The patient's first fall occurred at work while she was cleaning an ice skating rink, and she fell again a year later while walking in an icy parking lot. Prior to presenting to our clinic, she had tried gabapentin, NSAIDs, a walking boot, orthotic shoe insoles, and physical therapy with limited pain relief.

Physical examination revealed that she was suffering from sural neuralgia. To further confirm the diagnosis, we performed left sural nerve blocks on 2 separate occasions. Following each of these blocks, she experienced significant pain relief, reporting pain of 0/10 on the VAS; however, the pain relief lasted <24 hours. We decided to proceed with PRF ablation of the sural nerve to provide long-term pain relief. She tolerated the procedure well and had no complications. At her follow-up appointment, she rated her pain as 1/10 and reported an 80% overall reduction in her pain.

Procedures

Sural Nerve Block. The following protocol was used for all sural nerve blocks. Informed consent was obtained. The foot of interest was cleaned with chlorhexidine and sterilely draped. The area between the lateral malleolus and Achilles tendon was identified. A 25-g needle was introduced into the same area and directed toward the lateral malleolus in the anatomic location of the sural nerve. Following negative aspiration, 2 cc of 0.25% bupivacaine was injected, and the needle was removed. We monitored the patient for immediate postprocedure complications. The patient reported pain scores and percent improvement after the procedure.

Pulsed Radiofrequency Ablation. The following protocol was used for all PRF ablations. Informed consent was obtained. Preoperative sedation was provided with midazolam and fentanyl. The patient was placed in the supine position with the foot of interest elevated by a pillow. The foot was cleaned with chlorhexidine, and sterile drapes were applied to maintain optimal sterile conditions. The sural nerve was identified between the lateral malleolus and Achilles tendon, and 1% lidocaine was applied to anesthetize the overlying skin. Radiofrequency lesioning needles with active tips of 4 mm (used for Patient 1) or 10 mm (used for Patient 2) were inserted and directed toward the lateral malleolus in the anatomic location of the sural nerve. Sensory testing was performed at 50 Hz to ensure stimulation in the sural nerve distribution. Motor testing at 2 Hz was performed to ensure the absence of motor stimulation. PRF was performed using 40°C of heat (Patient

1) or 60°C of heat (Patient 2) for 180 seconds. Following the ablation, the needles were removed and the patient was monitored for immediate postprocedural complications.

DISCUSSION

Sural neuralgia resistant to conservative treatment is difficult to manage and can negatively impact patients' lives. Limited data are available regarding effective treatment options for sural neuralgia that is not responsive to conservative treatment. We have described 2 cases of sural neuralgia in which PRF ablation was used to achieve 80% pain relief. Our results are in line with those of Todorov who reported complete pain relief at 5-month follow-up in a patient with sural neuralgia who chose not to pursue medical management because of drug interaction concerns.³ A key distinction between the Todorov case and ours is that our patients had failed conservative medical therapies. Our results contribute to the small body of literature describing the effectiveness of PRF ablation for sural neuralgia. Currently, no gold standard treatment has been identified for sural neuralgia, and treatment is entirely provider-specific. Surgical intervention is common for patients suffering from treatment-resistant sural neuralgia despite limited evidence demonstrating the effectiveness of surgery. PRF ablation may be a safe alternative method to surgical intervention and is a particularly appealing option because it is minimally invasive, performed in an outpatient setting with minimal sedation, and avoids the risks associated with general anesthesia. The potential applications of PRF ablation are numerous; however, future studies are necessary to further elucidate these applications.

Chronic pain physicians began implementing PRF ablation into their practices in the 1970s.⁴ This implementation has been cautious, principally because limited evidence describes the effectiveness of PRF ablation, and the precise mechanism of PRF ablation-induced pain relief is not known. Anthony suggested that it may function through induction of a low-intensity electrical field around sensory nerves that leads to decreased conduction in C- and A-delta fibers.⁵ Our patients did not report any adverse effects during the perioperative period or at their follow-up visits, but we are not able to predict the complication rate in other patients given our small sample size.

CONCLUSION

Treatment-resistant sural neuralgia is a rare condition that few providers have experience managing. Here, we describe the safe and effective use of PRF ablation to achieve 80% pain reduction in 2 patients suffering from sural neuralgia. These results are promising; however, future research is needed to further elucidate the effectiveness of this intervention, its safety profile, and its scope of use.

ACKNOWLEDGMENTS

Dr Alaa Abd-Elseyed is a consultant for Innocoll, Medtronic, Halyard, Axsome, SpineLoop, and Ultimaxx Health. Otherwise, the authors report no financial or proprietary interest in the subject matter of this article.

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