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Two Cases of Dorsal Root Ganglion Stimulation for the Treatment of Postherpetic Neuralgia

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Background: Postherpetic neuralgia (PHN) is the most common long-term complication of shingles and is a significant burden to the patients due to pain and disability. Currently, treatment options are limited. In refractory cases, neuromodulation using spinal cord stimulation (SCS) and peripheral nerve stimulation (PNS) have been used but is considered experimental due to limited evidence. Dorsal root ganglion (DRG) stimulation has been most studied in complex regional pain syndrome and uses electrical leads that are inserted into the epidural space and placed into the intervertebral foramen to target the DRG. Due to the advantages on targeting the DRG, DRG stimulation has been used and can be considered to treat other refractory, intractable pain conditions.

Case Report: We report 2 cases who experienced successful treatment of refractory PHN. Patients underwent dorsal root ganglion stimulation at the thoracic level for the treatment of refractory PHN. Both patients showed significant improvement in pain at 24 and 36 months after a DRG stimulation trial and implantation.

Conclusion: We report the successful use of DRG stimulation for the treatment of PHN.

Key words: Dorsal root ganglion stimulation, neuralgia, neuromodulation, postherpetic neuralgia, spinal cord stimulation

BACKGROUND

Acute herpetic zoster (HZ), or shingles, caused by varicella zoster (VZ) virus, is common in the United States (1). Patients often suffer from neuropathic pain, which usually resolves within several weeks to months after onset (2). The pain can be severe, typically burning, sharp, jabbing, and aching in nature. Patients may have increased sensitivity to touch and pressure. Although most improve within several months, up to 20% continue to suffer with persistent pain (3). In these refractory cases, the term postherpetic neuralgia (PHN) is used. PHN is believed to be caused by damage or alteration of nerves that are responsible for pain and pressure. Treatments for PHN are limited, and at times suboptimal. In cases where conservative treatments such as topical analgesics, pharmacologic medications, and blocks have failed, neuromodulation, using spinal cord stimulation (SCS) and peripheral nerve stimulation (PNS), has been considered. We report the use of dorsal root ganglion (DRG) stimulation for the treatment of refractory PHN.

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CASE DESCRIPTION

Case #1

A 68-year-old woman presented for evaluation with a 2-year history of left-sided chest pain secondary to PHN. She had noted continued allodynia, burning, and sensitivity at the scarring, which was a few inches above her areola. On initial presentation, she was treated with antiretroviral medications without improvement. She experienced persistent severe burning pain despite trials of multiple medications including gabapentin, amitriptyline, pregabalin, hydrocodone, oxycodone, and lidocaine patches. She additionally underwent multiple interventional procedures including epidural steroid injections and intercostal nerve blocks without significant relief.

She subsequently underwent a DRG stimulation trial at the left T1 and T3 levels (Fig. 1) with 90% relief of her pain and improvement of prior noted hyperesthesia. Her score on the Visual Analog Scale {AU: for pain?} (VAS) decreased from 9 out of 10 to 1 out of 10. Allodynia improved and she was able to tolerate clothing and light touch to the affected area.

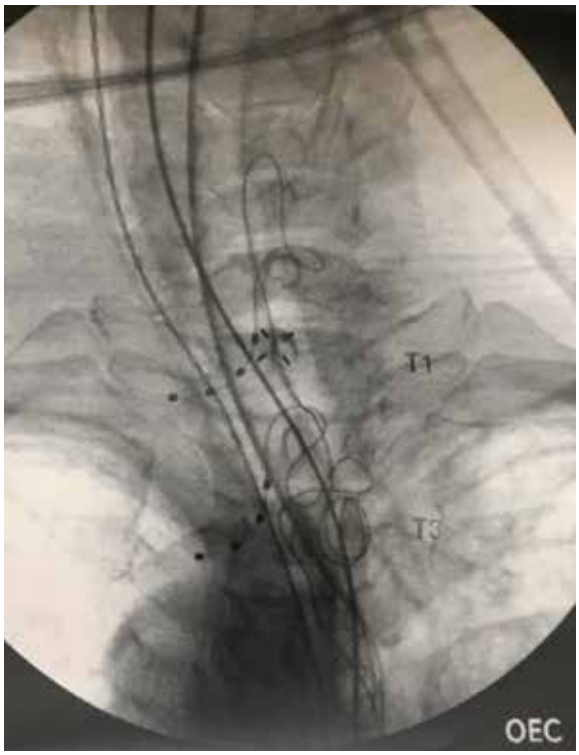

Fig. 1. Fluoroscopic images of DRG lead placement- Left T1 and T3.

She then underwent successful permanent implantation of the DRG stimulator. She had regular office visits after implantation but did not require adjustments to the stimulator after the 6-week postoperative visit. She estimated continued 98% relief of pain at 3 years post implantation.

Case #2

A 62-year-old man presented for treatment of persistent chest wall pain secondary to PHN that developed during the course of prostate cancer treatment. For over 12 months, he had been suffering with burning and shooting pain under his left armpit and chest slightly above the level of the areola, as well as right-sided thoracic back pain. The treatment regimen at the initial office visit was 3600 mg of gabapentin per day, a 75-mcg duragesic patch every 48 hours, and oxycodone 10 every 4 hours; his pain levels ranged from 7 out of 10 to 10 out of 10 on the VAS.

The patient underwent DRG stimulation at the right T2, T3, and T4 levels with 75% relief of prior noted pain. Following permanent implantation at T2 and T4 (Fig. 2), as the patient did not perceive any difference between T2/T4 stimulation vs T2/3/4 stimulation, the patient noted 80% relief at 24 months' follow-up. He was able to decrease the prior medication regimen to 2 to 3 10-mg tablets of oxycodone per day, as needed.

DISCUSSION

PHN is frequently encountered after HZ reactivation, occurring in up to 20% of patients aged 60 to 65 (3). The VZ virus remains latent in the DRG after initial infection and HZ transpires when the virus reactivates and travels down the sensory nerve to the affected dermatome. The condition is notoriously difficult to treat, with less than half of patients achieving 50% pain relief (4). Evidence for interventional treatments, including nerve locks, sympathetic blocks, and intrathecal injections are suboptimal (5). In refractory cases, neuromodulation, such as SCS, has been used, but the evidence is limited, particularly for long-term outcomes (6,7). Evidence for PNS is similar, with minimal long-term data (8,9). Additionally, the evidence to date for DRG stimulation has been limited and poor (10).

The DRG has long been recognized for its role in chronic pain. The DRG is a critical structure in sensory transduction and modulation, such as in pain transmission and the maintenance of persistent neuropathic pain states. The pathophysiology is complex, and DRG

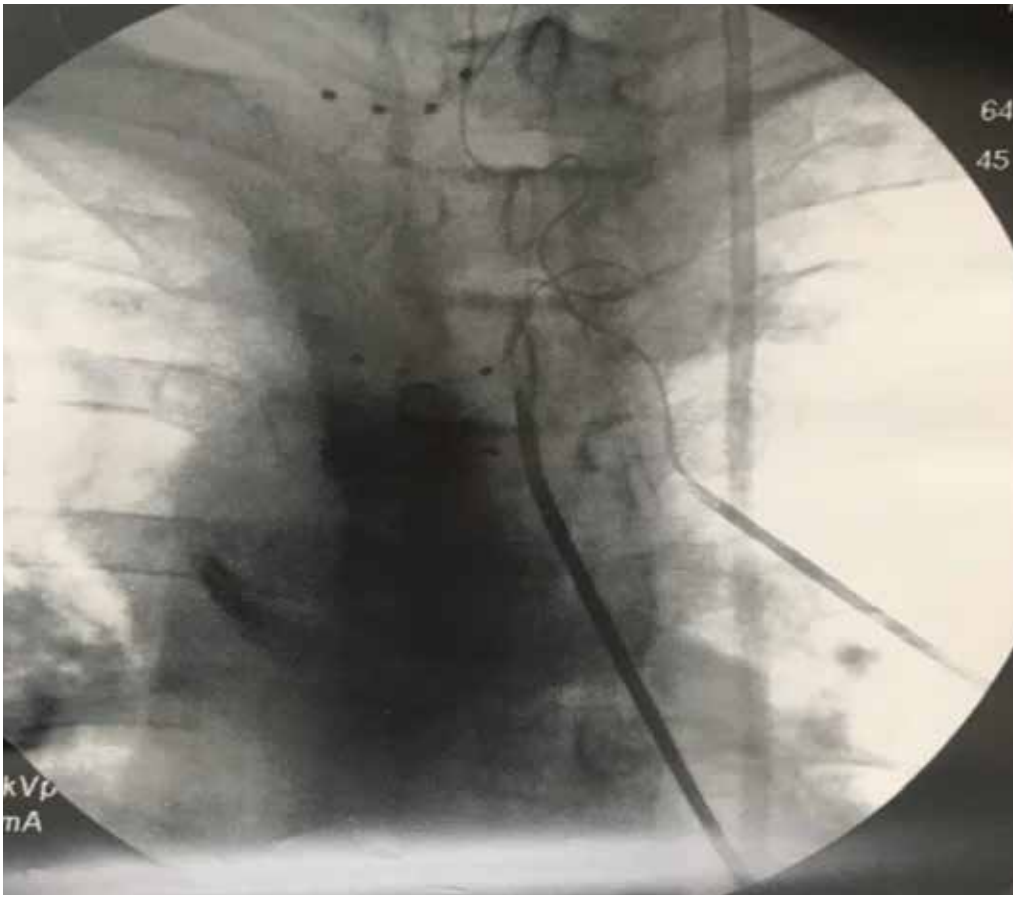

Fig. 2. Fluoroscopic images of DRG at Left T2 and T4.

neuron receptive fields and axonal arborizations are highly detailed. It has been reported that approximately one-third of neurons in the substantia gelatinosa receive inputs from up to 4 different dorsal roots. As a result, not only has the DRG been a target for treatment of pain, particularly neuropathic pain, neuromodulation of one DRG may have impact on other levels. It has been proposed that DRG stimulation reduces refractory pain by stabilizing and decreasing DRG hyperexcitability.

DRG stimulation has been most studied in complex regional pain syndrome (11). This treatment is also considered as a promising option in other chronic, intractable pain, particularly in pain conditions restricted to certain dermatomal regions. In both cases, patients who were refractory to standard treatment received significant, lasting benefit. They were both able to taper down or off various medications. DRG stimulation is a promising treatment modality warranting further study as represented in these case reports.

CONCLUSION

DRG stimulation is a novel neuromodulation treatment, and may be a viable option in the treatment of chronic intractable neuropathic pain.

REFERENCES

1. Insinga RP, Itzler RF, Pellissier JM, Saddier P, Nikas AA. The incidence of herpes zoster in a United States administrative database. ***J Gen Intern Med*** 2005; 20:748-753.
2. Kost RG, Straus SE. Postherpetic neuralgia–pathogenesis, treatment, and prevention. ***N Engl J Med*** 1996; 335:32-42.
3. Mallick-Searle T, Snodgrass B, Brant JM. Postherpetic neuralgia: Epidemiology, pathophysiology, and pain management pharmacology. ***J Multidiscip Healthc*** 2016; 9:447-454.
4. Schutzer-Weissmann J, Farquhar-Smith P. Post-herpetic neuralgia – a review of current management and future directions. ***Expert Opin Pharmacother*** 2017; 18:1739-1750.
5. Lin CS, Lin YC, Lao HC, Chen CC. Interventional treatments for postherpetic neuralgia: A systematic review. ***Pain Physician*** 2019; 22:209-228.
6. Demirel T, Braun W, Reimers CD. Results of spinal cord stimulation in patients suffering from chronic pain after a two year observation period. ***Neurochirurgia (Stuttg)*** 1984; 27:47-50.
7. Meglio M, Cioni B, Prezioso A, Talamonti G. Spinal cord stimulation (SCS) in the treatment of postherpetic pain. ***Acta Neurochir Suppl (Wien)*** 1989; 46:65-66.
8. Kouroukli I, Neofytos D, Panaretou V, et al. Peripheral subcutaneous stimulation for the treatment of intractable postherpetic neuralgia: Two case reports and literature review. ***Pain Pract*** 2009; 9:225-229.
9. Anthony CL, Tora MS, Bentley JS, Texakalidis P, Boulis NM. Dorsal root ganglion stimulation for thoracic neuralgia: A report of six cases [published online ahead of print May 7, 2019]. ***Cureus*** 2019; 11:e4615.
10. Rodriguez G, Palmer S, Vanderhoef K. Peripheral nerve stimulation treatment of post-herpetic neuralgia. ***Pain Med*** 2010; 11:300.
11. Upadhyay SP, Rana SP, Mishra S, Bhatnagar S. Successful treatment of an intractable postherpetic neuralgia (PHN) using peripheral nerve field stimulation (PNFS). ***Am J Hosp Palliat Care*** 2010; 27:59-62.
12. Deer TR, Levy RM, Kramer J, et al. Dorsal root ganglion stimulation yielded higher treatment success rate for complex regional pain syndrome and causalgia at 3 and 12 months: A randomized comparative trial. ***Pain*** 2017; 158:669-681.