

# Combining Botulinum Toxin (A) Injection With Peripheral Nerve Stimulation in a Patient for Intractable Ophthalmic Postherpetic Neuralgia

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**Background:** Postherpetic neuralgia (PHN) is a particularly challenging neuropathic pain condition, especially when it involves the trigeminal nerve. Peripheral nerve stimulation (PNS) can provide 50–70% improvement in pain to many who fail medical management. However, this pain relief can be incomplete, and residual pain may persist for many years. Here we report a case that was successfully managed by a novel technique of combining supraorbital nerve stimulation with botulinum toxin type A (BTA) for intractable ophthalmic PHN.

**Case:** A 73-year-old man presented with burning, stabbing, constant, severe pain in the ophthalmic branch of left trigeminal nerve dermatome, which had been present for a year. A permanent PNS provided 50% pain relief, but there was residual pain in the left orbital area that has remained, which was refractory to pharmaceutical treatment. Because of the restricted location of the residual pain, this patient was an appropriate candidate for BTA injection.

**Results:** Following the BTA injection, the patient had a significant improvement in pain relief and this continued for six months without any oral medication.

**Conclusions:** In a patient with trigeminal PHN, local injection of BTA effectively reduced pain remaining after treatment with PNS.

**Keywords:** Botulinum toxin type A, peripheral nerve stimulation, postherpetic neuralgia

**Conflict of Interest:** The authors reported no conflict of interest.

## INTRODUCTION

Postherpetic neuralgia (PHN) is a debilitating disease characterized by continued pain following an outbreak of herpes zoster. PHN can be significantly disabling and presents an economic burden due to associated healthcare costs and lost productivity. Invasive therapies have been pursued following the failure of pharmacological treatments, including peripheral nerve blocks, radiofrequency ablation, and neuromodulation. Specifically, neuromodulation often provides significant but incomplete pain relief. For example, neuromodulation provided 50–70% pain relief in patients who failed conservative management for chronic headache (1). Here we report a case of residual pain following neuromodulation for PHN that was successfully managed with the addition of botulinum toxin type A (BTA) injection.

## CASE DESCRIPTION

A 73-year-old male with a history of hypertension and coronary artery disease presented with debilitating pain on the left side of his forehead and scalp one year following an episode of herpes zoster. The pain was described as severe, burning, stabbing, aching, and constant, with an intensity of 8–9 on a 0–10 visual analog scale (VAS). Previously, the patient had been unsuccessfully treated with

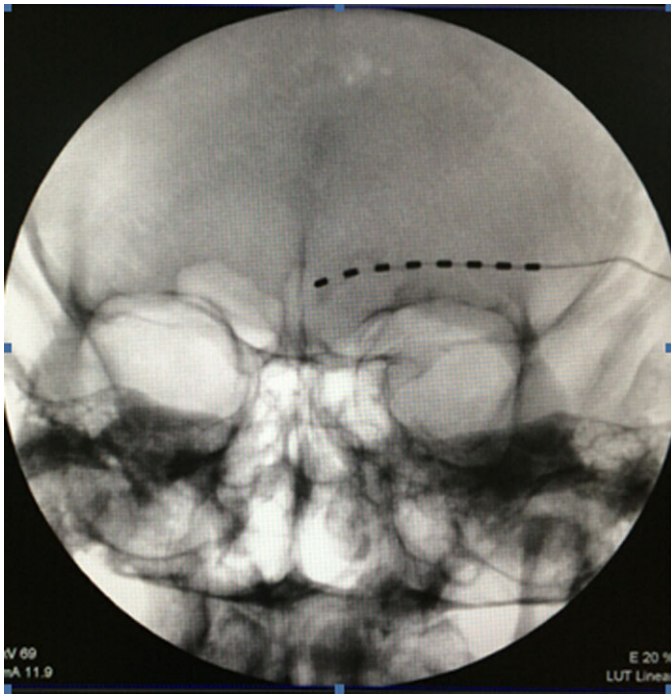
amitriptyline, gabapentin, pregabalin, tramadol, and sustained-release morphine.

The patient was diagnosed with intractable PHN in the left V1 division. Supraorbital nerve block followed by radiofrequency lesion of the supraorbital nerve branch failed to provide any pain relief. Written informed consent was obtained from the patient. A trial of supraorbital nerve stimulation with an eight-contact percutaneous lead (Octrode leads, St. Jude Medical, St. Paul, MN, USA) above the orbital ridge reduced his pain from 8–9 to 4–5 on the VAS, representing a 50–60% improvement. Sleep and mood were also improved. Following the successful one-week trial, an implantable pulse generator (IPG) unit was placed in the left pectoral region (Figs. 1 and 2). At two-week follow-up, the patient reported adequate analgesia over the forehead and scalp but not the canthi.

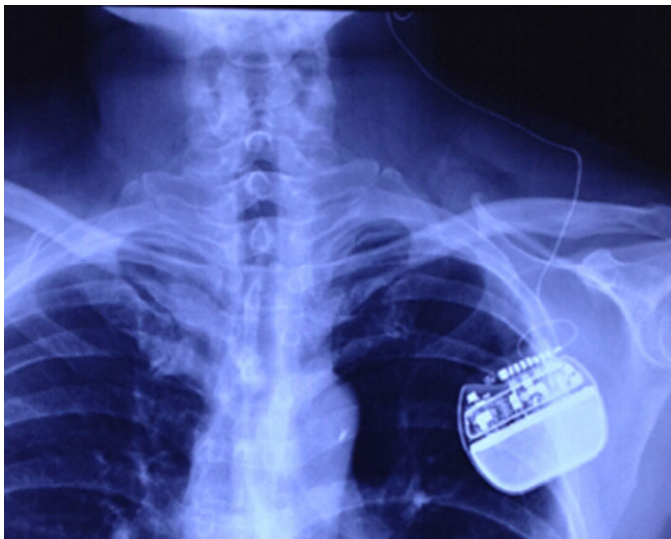
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**Figure 1.** Left supraorbital stimulator lead on a male with PHN. PHN, postherpetic neuralgia.



**Figure 2.** IPG was implanted in the left pectoral region. IPG, implantable pulse generator.

This residual pain caused him to be apprehensive of washing his face. The stimulation was best at the following settings: pulse width of 350  $\mu$ s, frequency of 40 Hz, constant current amplitude of 5.5 mA, and contact polarity of 1 – 2 – 3 – 4 – 6 + 7 + 8 +. This program was used 70% of the time. Electrode migration was ruled out through radiographs.

At the four-week follow-up, the patient continued to describe the intensity of his pain as 4–5. At this point, the patient received a subcutaneous injection of 100 units BTA at the left orbital region (2). Postinjection, the patient reported progressive improvement at the

one-week, one-month, three-month, and six-month visits. By his last visit at six months, he no longer required pain medication with an intensity of 2–3 VAS and was able to resume normal activities and sleep.

## DISCUSSION

PHN involving the ophthalmic branch of the trigeminal nerve (TGN) most frequently occurs in older adults. It is more difficult to treat than classic PHN (3). Wall and Sweet pioneered peripheral nerve stimulation (PNS) in 1967, inserting electrodes into their own infraorbital foramina. The first reported use of PNS for unremitting ophthalmic PHN occurred in 2002, with 40–60% improvement in pain (4). Johnson and Burchiel performed a retrospective case series in which patients underwent subcutaneous placement of stimulating electrodes for treatment of V1 or V2 trigeminal neuropathic pain secondary to herpetic infection or facial trauma (1). In this study, PNS provided at least 50% pain relief in 70% of patients. Interestingly, there were no treatment failures in the post-traumatic group, but two failures (50%) occurred in the PHN group.

The efficacy of PNS is limited by a number of factors including suboptimal positioning or migration of the electrodes (5). In our case, the patient had significant symptomatic improvement with the stimulation, including analgesia throughout most of the affected area with the exception of the canthi. To address this residual pain, we considered surgical options including revising the electrode placement or adding another electrode. However, revision would have involved further tissue dissection and tunneling without guaranteed expansion of the covered area. An addition of another electrode would have given possible benefit; however, it would also have placed a financial burden on the patient, especially because we have rich experiences about BTA injection for PHN. BTA may inhibit peripheral sensitization of nociceptive fibers and neurogenic inflammation. Our studies with BTA now at five years continue to show benefit. Therefore, we decided to inject BTA at the remaining allodynic area. In agreement with a previous report (2), BTA alleviated allodynia and hyperalgesia associated with PHN. This approach not only produced better pain relief but also reduced the risks of lead migration, allodynia at the lead site, and reoperation.

## CONCLUSION

Local injection of BTA may be a reasonable therapeutic option for residual PHN pain that remains outside of the area of relief provided by PNS.

## Acknowledgements

We are grateful to Jianguo Cheng and Jane Wang for their revisions.

## Authorship Statements

Dr. Li was responsible for patient follow-up and data collection. Dr. Xiao designed and conducted the study and prepared the manuscript.

**How to Cite this Article:**

Li D., Xiao L. 2015. Combining Botulinum Toxin (A) Injection With Peripheral Nerve Stimulation in a Patient for Intractable Ophthalmic Postherpetic Neuralgia. *Neuromodulation* 2015; E-pub ahead of print. DOI: 10.1111/ner.12311

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