

## Original Article

# Pulsed radiofrequency to the great occipital nerve for the treatment of intractable postherpetic itch: a case report

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**Abstract:** A patient with intractable postherpetic itch lasting for 1 year was reported. The itch was mainly from the left vertex, frontal and ophthalmic regions and extended to the left neck area. The patient had negative response to the ophthalmic nerve block. Under the initial positive response to the great occipital nerve block, pulsed radiofrequency (PRF) was performed on the position of the great occipital nerve. After 4 months treatment, the itch was completely vanished. This case study demonstrates the effectiveness of PRF for intractable postherpetic itch originating in the head and neck. However, more samples needed to verify this management.

**Keywords:** Postherpetic itch, pulse radiofrequency, great occipital nerve

## Introduction

Chronic itch, an unpleasant skin-specific sensation with a characteristic desire or reflex of scratching behavior [1-3], occurs in a fraction of postherpetic patients [4, 5], which is more likely to be present after herpes zoster affecting the head and/or neck, particularly the ophthalmic division of trigeminal nerve [6]. Clinical data suggest that postherpetic itch (PHI) may be even more resistant to treatment than postherpetic pain. One possible mechanism presumed from Oaklander et al for PHI is that few remaining cutaneous neurons may contain itch specific C-fibers from adjacent uninfected dermatomes [7].

Previous studies have shown that pulsed radiofrequency (PRF) is a minimally invasive procedure used to treat a variety of chronic pains [8-10]. PRF is considered to be a safe and effective pain intervention with minimal side effects [11-13], and the neuromodulation is proposed as the possible mechanism [14, 15]. We speculate that the uninfected great occipital nerve may be involved in the intractable postherpetic itch mainly originated in ophthalmic division of trigeminal nerve.

## Case report

A 56-year-old man presented our hospital with the complaint of severe pruritus and burning pain on the left vertex and frontal region for 10 months. The shingles were developed on the patient's left ophthalmic branch of trigeminal nerve approximately 1 year ago, accompanying with lightening and burning pain. He was referred to the hospital and treated with acyclovir (400 mg, 5 times a day, for 7 days), Vit B<sub>12</sub> (0.5 mg, 3 times a day) and supraorbital and supratrochlear nerve blocks (2% lidocaine 1ml and diprospan 1 mg one time, 3 times). The rash was resolved within 2 weeks and his pain score reduced from 8/10 to 2/10, and then he was discharged with carbamazepine (200 mg/d). One week later (3 weeks after eruption), the patients returned to the hospital and presented with a gradually incremental itching in the same distribution. The pruritus severity was a 5/10 with occasional exacerbations to 7/10. He can get temporary relief from scratching and cooling. The pain became exacerbated when the itch intensity was transiently relieved and can not be resolved even with supraorbital and supratrochlear nerve blocks, acupuncture, ami-



**Figure 1.** The extent of pigmentation after itching. Picture taken before the great occipital nerve block and pulsed radiofrequency showing the beginning of mild swelling and resolution of cellulitis.

triptyline or carbamazepine. He had no vision problem all the time. His physical examination showed pigmentation on the left vertex and frontal region and the skin was hypersensitive to touch in the same distribution. The patient rated itching intensity as 5/10 and pain intensity as 2/10 with clear scratching signs observed on his left vertex and frontal region. The corneal reflex and lab tests were normal. He complained that many physicians didn't know other options, and he had poor sleep since he has this disease (**Figure 1**).

After obtaining written consent, a diagnostic nerve block was done on the great occipital nerve and the intensity of itch was relieved in 40 min. the pulsed radiofrequency was performed in conjunction with the great occipital nerve at 37°C for 120s and 42°C for 120s under the ultrasound guidance. at last, 1 mg Diprosan, 0.5 mg Vit B<sub>12</sub> and 1 ml of 1% lidocaine plain was injected (total volume 2 ml). In the following 2 days, he rated his itch severity at 1/10 on a 0-10 scale of ascending severity, but his pain severity exacerbated to 5/10, then pulse radiofrequency was done on the great

occipital nerve and supraorbital nerve respectively, and gabapentin 300 mg was taken once a day regularly. There was an improvement, the pain intensity was 1/10 and itch intensity resolved completely 1 week later, then gabapentin was reduce to 200 mg once a day and the patients discharged. An outpatient follow-up was advised for the patient, the dose of gabapentin was reduced to 100 mg once a day without recurrence of symptoms 3 weeks later. After 12 weeks, the symptoms resolved completely without any oral medication.

### Discussion

Several studies have shown that the trigeminal sensory ganglion is the most frequent site of latency for the varicella virus, and herpes zoster ophthalmicus prevalence is only second to the thoracic dermatomes [6]. Patients whose shingles affected the head and neck were more likely to experience PHI [16].

Resembling to the PHN, PHI results from neuronal damage, one study has revealed profound damage to most sensory modalities and loss of 96% of epidermal innervation in the itchy area [6], but the exact mechanism of PHI is not well understood.

PHI could cause significant disability and suffering, but there have been no clinical trials of potential treatments for PHI, the existing knowledge about the treatment for PHI comes from some successful case report and clinical experience suggests that PHI may be even more resistant to treatment than PHN.

Case reports support utility of topical local anesthetics [7], gabapentin [17], carbamazepine [18] for PHI, but other case reports reveals that some patients are resistant to these medications.

Elkersh [19] depicted that a 73-year-old woman with metastatic malignant melanoma developed acute V1 herpes zoster-related pain and itching unresponsive to conventional oral medications, she had significant reduction in the frequency and intensity of the lancinating attacks after placement of a thoracic epidural catheter with continuous infusion of clonidine and bupivacaine, the itching resolved completely, but clonidine's analgesic activity is mediated through presynaptic and postsynaptic receptors localized in the superficial layers of the spi-

nal dorsal horn, no data has showed the relationship between the spinal dorsal horn and the trigeminal sensory ganglion, so we considered whether the itch fiber that was involved in V<sub>1</sub> PHI come from the spinal dorsal horn.

Another report [5] finds efficacy of sequential bupivacaine injection through a catheter placed near stellate ganglion for herpetic zoster of the neck and scalp, the patient is a 10-year-old male with Fanconi's and aplastic anemia, refractory to H1 and nonselective antihistamines, intravenous ondansetron, tricyclic antidepressants, anticonvulsants and analgesics (narcotic and non-narcotic) and requiring intravenous sedation.

Analogue to these case reports, our patient suffered from postherpetic itching and a combination of acupuncture, supraorbital and supra-trochlear nerve blocks, amitriptyline and carbamazepine brought poor results, so we decided to do an intervention therapy for this patients. Given that the great occipital nerve is one of the main sensory nerve that dominate the head, itch-specific C-fibers have large innervation territories and often extend from a normal dermatome into the adjacent zoster-affected dermatome, and the itch fiber that was involved in V<sub>1</sub> PHI may come from the spinal dorsal horn, A diagnostic nerve block was performed on the great occipital nerve. Pulsed radiofrequency was performed adjacent to the great occipital after obtaining a satisfactory outcome from the nerve block, pulsed radiofrequency has been proved effectively for PHN [9] and cervicogenic headache [20].

### Conclusion

Collectively, our data demonstrated that PRF is a potential treatment option with good outcomes for patient suffering from intractable postherpetic itch related to the great occipital nerve. Further studies should be undertaken to elucidate the nature of PRF so that we may more effectively apply this treatment to the patients with intractable postherpetic itch.

### Disclosure of conflict of interest

None.

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