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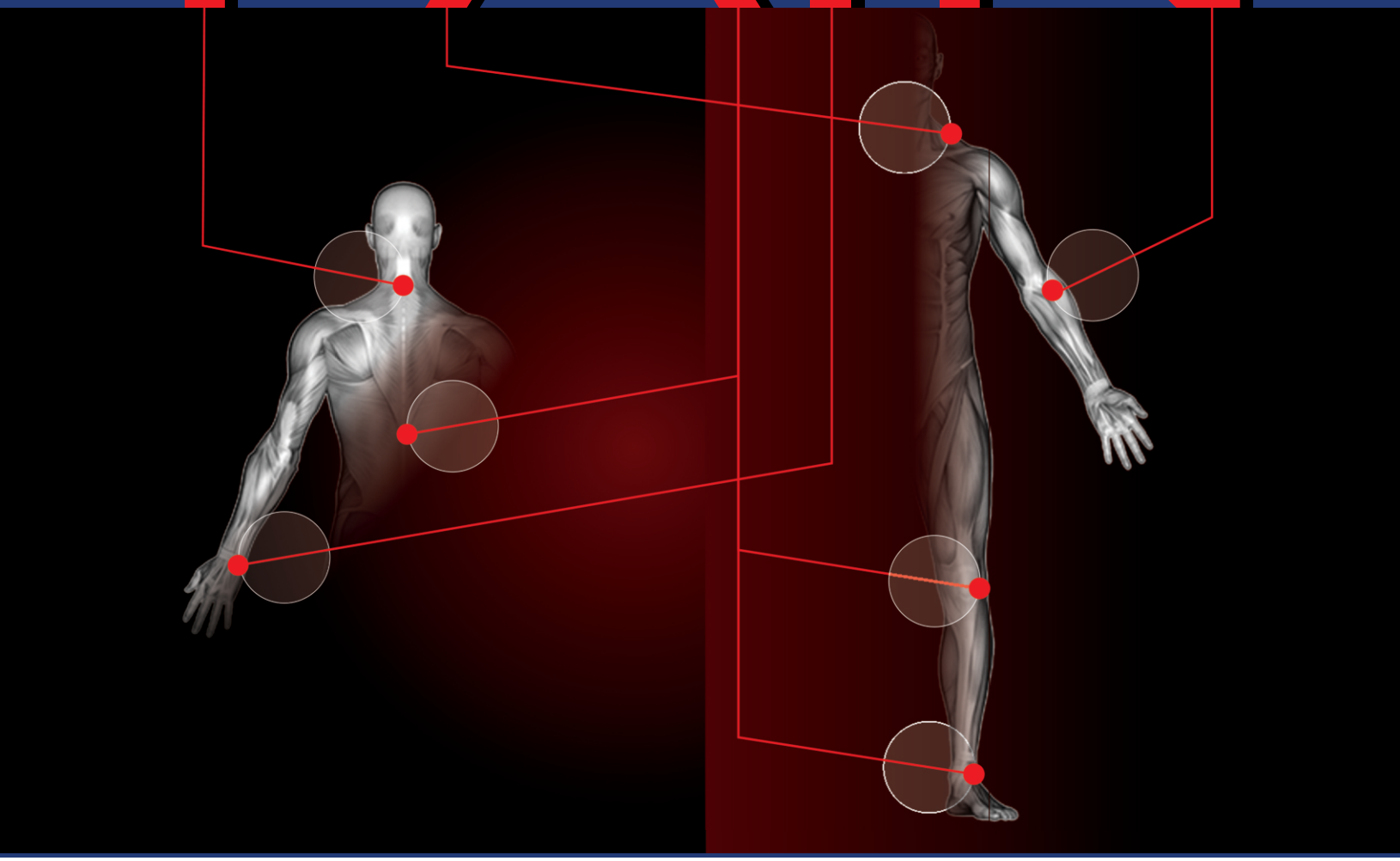

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Case Report

Ultrasound-Guided Supraorbital Radiofrequency Ablation for V1 Postherpetic Neuralgia

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Abstract

Postherpetic neuralgia (PHN) affecting the first division of the trigeminal nerve (TrN) (V1) is a difficult to manage condition, characterized by neuropathic symptoms such as burning sensation, allodynia, and hyperalgesia that continues even after the resolution of the acute phase and decreasing the patient's quality of life. Interventional procedures such as Gasserian Ganglion continuous radiofrequency (CRF) have been performed to control pain despite the possible complications involving V1 division. We present the case of a 47-year-old male with PHN at V1 successfully treated with ultrasound-guided CRF at the supraorbital foramen. Postherpetic, neuralgia, TrN, facial pain, neuropathic pain, trigeminal ganglion, interventional ultrasonography, chronic pain, and hyperalgesia.

Keywords: Chronic pain, facial pain, neuropathic pain, postherapeutic neuralgia, trigeminal neuralgia

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Introduction

Herpes zoster (HZ) is an acute and localized infection caused by varicella zoster virus. The reactivation of the latent form of the virus within the dorsal root ganglion causes viral replication followed by its propagation through the sensory nerves, with the peripheral nerve corresponding to the involved dorsal root ganglion being the most affected, presenting demyelination, fibrosis, and cellular infiltration, causing a complication known as postherpetic neuralgia (PHN), which is characterized by neuropathic symptoms such as burning sensation, allodynia, and hyperalgesia that continue even after the resolution of the acute event, and these symptoms can persist from months to years after the acute phase.[1,2] PHN occurs in approximately 10%–15% of all patients with HZ infection, increasing its incidence as age advances, affecting up to 30% of patients older than 80 years and rare in those younger than 50 years.[3,4]

The first division of the trigeminal nerve (TrN) (V1) is most commonly involved in postherpetic trigeminal neuralgia (PHTN), being 20 times more frequently affected than V2 and V3 branches, differentiating from trigeminal neuralgia (TN).[4,5] PHN can become disabling and cause a significant decrease in the quality of life, especially if V1 is involved. The incidence of TrN affected by HZ is 15%–19% compared to thoracic PHN with 53%, cervical 20%, and lumbosacral 11%.[4,6]

The management of TN-related pain, regardless of its etiology, is complex, requiring a multidisciplinary approach. The European Academy of Neurology guideline on TN recommends pharmacological management as the first- and second-line treatment, leaving interventional procedures as the third-line management.[7] Both, conventional and pulsed radiofrequency (PRF) of the Gasserian ganglion, has been referred with a low level of evidence and weak recommendation.[8]

We present the case of a V1 PHTN successfully treated with ultrasound-guided continuous radiofrequency (CRF) ablation of the supraorbital nerve.

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Case Report

A 47-year-old male with a history of nonHodgkin's lymphoma who was referred by the neurology department to our pain management center for suffering from facial pain located in the frontotemporal and supraorbital region of the left hemiface, following the distribution of the terminal branch of the ophthalmic division (V1) of the TrN. Three months ago, he presented vesicular type eruptive mucocutaneous lesions located in the left frontal region, which did not cross the midline of the face. Following a spontaneous resolution of lesions, the patient continued with severe pain that progressively increased in intensity until it became disabling.

Current pain is of severe intensity, with a baseline score of 6/10–9/10 on the Visual Analog Scale (VAS) despite the pharmacologic treatment, which was carbamazepine 200 mg every 12 h, amitriptyline 25 mg every 24 h, melatonin 5 mg every 24 h, and tapentadol 50 mg extended release every 12 h during the previous 3 weeks with poor pain relief.

The symptoms were characterized by an electrical shock-like intense pain, with burning sensation in the V1 distribution, along with allodynia and hyperalgesia in the same area at the examination. The diagnosis of PHTN was made based on the patient's history, symptomatology, and physical examination. It was decided to perform ultrasound-guided supraorbital block with 1 ml of 2% lidocaine and 4 mg of dexamethasone. Immediately after the procedure, the patient reported an improvement on VAS from 9/10–3/10 that lasted 2 weeks. Based on the poor resolution of the symptoms despite the pharmacologic treatment and only 2 weeks of improvement with ultrasound-guided blockade, we decided to perform ultrasound-guided CRF of the supraorbital nerve which is the terminal branch of V1, considering the intense refractory neuropathic pain. The procedure was explained to the patient, including the risks, possible complications, and potential benefits; informed consent was obtained and the patient was scheduled for the procedure.

Technique

The patient was placed in the supine position. Standard monitoring, such as electrocardiography, noninvasive blood pressure monitoring, and pulse oximetry were placed, and O2 was administered through a nasal cannula 2 mg midazolam IV and 75 mcg fentanyl IV were administered for sedation. The area over the injection site was properly prepped and draped. We used a 6–15 MHz linear transducer (Sonosite M-turbo, Fujifilm, United States) and sterile gel. Under sterile conditions, the ultrasound transducer was placed longitudinal in the supraciliary arch to locate the supraorbital foramen, and within the foramen the V1 branch of the TrN was identified [Figure 1]. The needle (SMK 22 Gauge 10 mm active tip) was inserted in the plane under direct ultrasound vision until the needle was close to the supraorbital foramen [Figure 2]. Once its location was confirmed, sensory stimulation was performed using at 50 Hz, 0.3–0.5 V electrical current, that reproduced paresthesia over the supraorbital innervation. After the sensory test, we injected 0.5 ml 2% lidocaine and CRF was performed using two cycles of 120 s at 70°C.

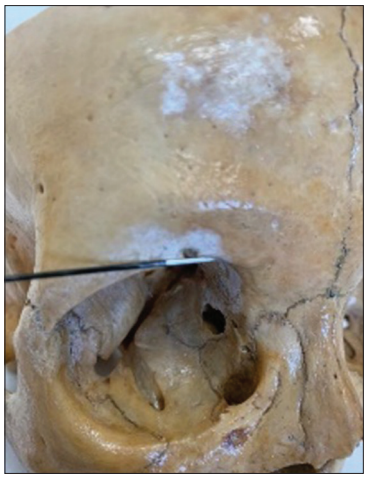

Figure 1: Adequate position of the radiofrequency cannula above supraorbital foramen

The intensity of pain was evaluated using VAS and the Barrow Neurological Institute scale, in addition to the report of improvement by the patient using the Patient Global Impression Scale prior, immediately after the procedure, at the 3rd month, 6th month, 1 year, and 2 years after the procedure. The results obtained are described in Table 1. A significant improvement was obtained in all the scales from the 3rd month onward after the procedure, in addition to a reduction in the use of oral analgesics to the point they were used only sporadically.

Discussion

CRF in the Gasserian ganglion is commonly indicated in the management of idiopathic TN. In a review, Hong *et al*. recommend a temperature between 68°C and 75°C, according to the reported pain relief rates, as well as the increase in complications, such as decreased corneal reflex, masseter weakness, dysesthesia, anesthesia dolorosa, keratitis, transient cranial paralysis of cranial nerves III and VI, cerebrospinal fluid leak, carotid cavernous fistula and aseptic meningitis, when temperatures >75°C were used.[9] The above complications may be due to the fact that an increase in temperature affects the Aα and Aβ fibers in a nonselective way. If the V1 branch is involved, a temperature <65°C is suggested at the level of the GG to reduce the risk of decrease or abolition of the corneal reflex.[9] Yao *et al*. reported using a combination of CRF and PRF of the Gasserian ganglion for V1 TN with good analgesic results, showing complications such as the presence of facial dysesthesia and corneal hypoesthesia in 39.2% of patients with CRF and 10.7% with the combination of CRF and PRF, lasting up to 18 months after the procedure.[10]

Recently, two cases of bipolar PRF were reported in young patients with the diagnosis of V2–V3 TN with adequate pain relief at 2 years follow-up, aiming up to prevent the adverse effects of CRF.[11]

Regarding to peripheral branches of the TrN, Ren *et al*. conducted a retrospective study in 53 patients with the

Table 1: Visual Analog Scale score, Barrow Neurological Institute Index, and Patient Global Improvement Scale 2-year follow-up

Scales	Preprocedure	After procedure	3 months	6 months	12 months	24 months
VAS	6/10	0/10	1/10	0/10	0/10	0/10
BNI	Severe pain, no relief with medication	No pain, No medication required	Some pain, adequately controlled with medication	No pain, no medication required	No pain, no medication required	No pain, no medication required
PGIC	V/V	I/V	III/V	I/V	I/V	I/V

BNI: Barrow Neurological Institute, PGIC: Patients Global Impression of Change, VAS: Visual Analog Scale

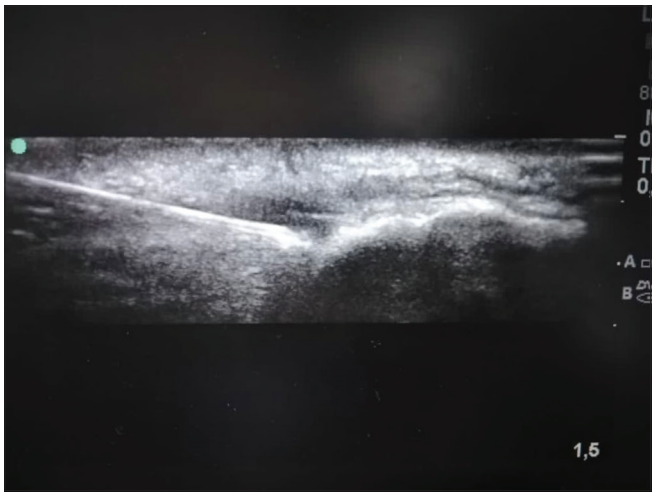

Figure 2: In plane image of the supraorbital foramen and the cannula. With permission of the patient

diagnosis of supraorbital neuralgia who were treated with ultrasound-guided CRF in the supraorbital nerve, obtaining excellent pain control with a recurrence-free rate of 96.2% at 12 months, 88.4% at 24 months and 82.7% at 36 months, 70% at 48 months, 66.3% at 60 months, and 49.7% at 97%.[12]

Huibin studied 50 patients with TN affecting the first branch and compared CRF of V1 at the Gasserian ganglion versus peripheral branch of V1 division of the TrN reporting a similar pain improvement and recurrence rate after 3- and 5-year follow-up.[13] These results were reflected in the study of Bharti *et al*., who compared CRF of the Gasserian ganglion versus the peripheral branches of the TrN as a treatment for TN[14] and reported that CRF of the peripheral branches of the TrN as effective as CRF of the Gasserian ganglion for the management of TN. In our patient, an excellent response in pain relief was observed after treatment with the technique described after 2 years follow-up.

PHTN in the V1 division is a difficult to manage condition, considerably affecting the patient's quality of life. The CRF of the peripheral trigeminal branch can be a safe and effective option in the treatment of postherpetic-related head and facial pain, as well as an easier and faster to perform procedure compared to Gasserian ganglion CRF.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understand that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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