

# Pulsed Radiofrequency to the Dorsal Root Ganglion in Postherpetic Neuralgia

Radiofrequenza pulsata al ganglio della radice dorsale  
nella nevralgia posterpetica

## Case report

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**Summary** Herpes Zoster is an infectious disease caused by the reactivation of the latent varicella-Zoster virus. Post-herpetic neuralgia (PHN) is the most common complication of herpes Zoster and can impair the quality of life due to severe pain symptoms. Post-herpetic neuralgia is difficult to treat and over 50 percent of patients fail to achieve satisfactory pain relief. The authors present a clinical case involving a 74-year-old patient suffering from Post-herpetic neuralgia; this study reveals that dorsal root ganglion pulsed radiofrequency was effective in treating Post-herpetic neuralgia.

**Riassunto** L'Herpes Zoster è una malattia infettiva causata dalla riattivazione del virus latente della varicella-zoster. La nevralgia post-erpetica (PHN) è la complicanza più comune dell'herpes Zoster e può compromettere la qualità della vita a causa dei sintomi, soprattutto del dolore grave. La nevralgia post-erpetica è difficile da trattare e oltre il 50 per cento dei pazienti non riesce a ottenere un soddisfacente sollievo dal dolore. Gli autori presentano un caso clinico che riguarda un paziente di 74 anni affetto da questa malattia; lo studio rivela che la radiofrequenza pulsata del ganglio della radice dorsale è stata efficace nel trattamento della nevralgia post-erpetica.

**Key words** Herpes Zoster, Post-herpetic Neuralgia, Neuropathic Pain, Pulsed Radiofrequency, Dorsal Root Ganglion

**Parole chiave** Herpes Zoster, Nevralgia post-erpetica, Dolore neuropatico, Radiofrequenza pulsata, Ganglio della radice dorsale

## Introduction

Herpes Zoster is an infectious disease caused by the reactivation of latent varicella-zoster virus (VZV), with a lifetime

incidence of 30%.<sup>1</sup> Symptoms are non-specific and range from itching to an intense burning sensation.<sup>2</sup> The mechanisms of pain in the acute phase of herpes Zoster are not completely clarified.<sup>3,4</sup> Studies demonstrated that a combination of neuropathic and nociceptive pain is generated. The nociceptive component is caused by the skin inflammation that leads to excitement and sensitization of nociceptors.<sup>5</sup> Furthermore, an increased afferent activity transmitted to the spinal cord produces a central hyperexcitability state in the neurons of the posterior horn of the spinal cord, which decreases progressively in conjunction with the healing of tissue damage in the majority of patients. The neuropathic component is caused by direct damage caused by the virus and the inflammation in the dorsal root ganglion, in the peripheral nerve and in some cases also in the dorsal roots and spinal cord. The most common, and one of the most fearsome, complication of the infection is the post-herpetic neuralgia, whose incidence is directly related to aging.<sup>6-8</sup> Post-herpetic neuralgia often impairs patient's quality of life due to the related, and severe, painful symptoms.<sup>9,10</sup> Post-herpetic Neuralgia is defined as a pain distributed in the segment affected by the typical acute herpetic eruption, which persists after healing of the rash (usually one month after their onset). The incidence was estimated between 9 and 14 percent of cases affected by the acute form.<sup>11,12</sup> Postherpetic Neuralgia is difficult to treat and over 50 percent of patients fail to achieve satisfactory pain relief, despite the application of the most effective methods of treatment available, including opioids.<sup>13</sup> Pulsed Radio Frequency is considered a safer strategy compared to the classic Radio Frequency treatment.<sup>14</sup> PRF act mainly, or exclusively, on the unmyelinated C fibers (this would explain their ability to provide pain relief without interfering with the motility and the sensitivity) or on myelinated A Delta and A Beta fibers.<sup>15</sup>

## Case report

A 74-year-old man with a herpetic infection lasting over ten months. It presents neuropathic pain diagnosed by a pain therapist and described using the Numerical Rating Scale (NRS) of 10 points, in the right subcostal region until reaching the navel region (**Figure 1**). The patient was initially treated with pregabalin (maximum dose of 75 mg, 3 times a day) and tapentadol (maximum dose of 300 mg, 2 times a day).<sup>16</sup> Furthermore, in association with the pharmacological therapy, a 5% lidocaine patch was applied in the topographical region of the rash. Initial therapy was not effective to treat pain, and, on the basis of the therapeutic failure of the initial pharmacological strategy, the patient underwent a cycle of 3 paravertebral blocks with Electrical Nerve Stimulation (ENS), performed using ultrasound guidance. This strategy was capable to obtain a partial reduction of the symptomatology for short periods (of 5 days maximum). To improve the positive effects obtained, the physicians decided to perform a PRF treatment (**Figures 2 and 3**) of the T12 and L1 ganglia (PRF 65V for 5 minutes). After this cycle, the patient reported partial pain relief, within the 48 hours following the treatment, which was followed by the resumption of pain symptoms. Thirty days after the PRF treatment, a reduction of 50% of the pain symptomatology (NRS 5) was shown during the algological follow-up examination. On this occasion the dosage of pregabalin (75 mg 1 time a day) and tapentadol (150 mg 2 times a day) was reduced. Sixty days after the execution of the PRF the pain was further reduced (NRS 3), and the pharmacological therapy was subsequently suspended. After 30 days the patient did not take any opioids, continue instead to take pregabalin 75 mg (1 time a day). Ninety days after the PRF, the pain remains tolerable (NRS 3), the patient reported a feeling of discomfort and rare "electric shocks" during sudden movements.

## Discussion

PRF of dorsal root ganglion (DRG) represents an innovative technique, in those cases where standard approaches are marginally effective.<sup>17,18</sup>

This procedure has a relatively lower impact on hemodynamics. Although the exact analgesic mechanism of PRF has not been fully elucidated, recent finding reported an increased c-fos expression,<sup>19,20</sup> that could be an evidence of small Alpha, Delta and C fibers selective lesioning,<sup>21</sup> and increased synaptic transmission changes,<sup>22</sup> and this neural tissue modification may contribute to the long-term effects of PRF. Although further controlled prospective trials, with appropriate sample sizes, are needed to prove these findings.

## **Conclusion**

This study revealed that DRG-PRF was effective in treating pain symptoms of Post-herpetic Neuralgia.<sup>23,24</sup> On the basis of our results, in cases with progressive neuropathic changes such as those following the acute stage of herpes Zoster, dorsal root ganglion pulsed radiofrequency treatment could represent an effective therapeutic option for pain symptoms of Post-herpetic Neuralgia.

## **Conflict of interest**

The authors certify the study was conducted without conflicts of interest.

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