Effects of photobiostimulation in the treatment of post-herpetic neuralgia: a case report

Abstract

Objectives: to describe the effect of photobiomodulation therapy in the treatment of post-herpetic neuralgia in the elderly. Case report: a female patient, 61 years old, 56 kg, 1.67cm tall, sought treatment at the Laser Therapy Center of the Universidade do Vale do Paraíba, in the city of São José dos Campos, São Paulo, Brazil, on October 27, 2015. She had been diagnosed with herpes zoster on September 4, 2015 with complaints of intermittent neuralgia in the long thoracic nerve path and spikes of intense pain (level 10, according to the analogue pain scale). Photobiomodulation was performed with low intensity laser spot irradiations at 20 points around the herpesvirus nerve, with a distance of 2cm between each point. Irradiation was performed at each point after 20 seconds, with 3J/cm² per point and total energy of 60 J. At the end of the treatment the pain level was 0 and the patient exhibited a normal sleep pattern (8 hours of sleep). Conclusions: Photobiomodulation treated painful discomfort, improved the quality of life of the patient and proved to be an effective, safe and promising treatment, with significant potential to become the therapy of choice in such cases.

Keywords: Herpes Zoster. Elderly. Neuralgia. Low-Intensity Laser Therapy.
INTRODUCTION

The name herpes comes from the Greek *herpein* which means "that emerges unexpectedly," as the condition in its different viral forms may remain latent for years until primary infection breaks out1.

The varicella-zoster virus (VZV) is a *herpesvirus* that causes chickenpox and remains latent in the nervous system after a primary infection. The reactivation of VZV in the cranial nerve or in the dorsal root ganglion, which propagates along the sensory nerve to the dermatome, leads to painful cutaneous manifestations, a condition known as herpes zoster2.

The reactivation of *herpesvirus* is closely correlated with the immune system, as the disease mainly occurs in individuals immunocompromised by other diseases, such as cancer, acquired immunodeficiency syndrome, post-transplant immunosuppression and chemotherapy. There is a strong correlation between the increased incidence of herpes zoster (HZ) with increasing age, especially among those over 55 years, as advanced age is associated with a decline in T cell-mediated immune response1,3.

The clinical picture of HZ is almost always typical. The majority of patients report neuralgic pain prior to skin lesions, in addition to local paresthesia, burning and pruritus, accompanied by fever, headache and malaise. The elemental lesion is a vesicle with an erythematous base. The rash is unilateral, rarely crosses the midline, and follows the path of a nerve. The symptoms emerge gradually, establishing themselves over two to four days2,4.

Most diagnoses are performed clinically without the need for further tests. Several other skin diseases may appear similar, and should be considered as part of a differential diagnosis. The diagnosis is more likely to be HZ in those with a previous known history of varicella and with the classic manifestations: prodromes of pain, cutaneous eruption and dermatome distribution and neuralgia1,2.

Neuralgia, the most common symptom in patients with HZ, is characterized by chronic neuropathic pain in the affected nerve pathway. It lasts for at least one month, begins between one and six months after the rash has been cured, and may persist for years.

The incidence of post-herpetic neuralgia (PHN) varies between 10% and 20% in immunocompetent elderly persons5.

Therefore, the use of low intensity laser treatment (LIL) represents a viable therapeutic approach to PHN treatment. In the health sciences LIL has been consistently employed in clinical practice due to its anti-inflammatory, analgesic and anti-edematous effects and contribution to tissue repair4. The effects mentioned also include an acceleration in the process of bone sedimentation and the degranulation of mast cells, as well as promoting an increase in peripheral circulation, vasodilation and fibroblastic proliferation5.

Therefore, the present case report aimed to describe the effect of photobiomodulation in the treatment of post-herpetic neuralgia in the elderly.

CASE REPORT

The present study was carried out at the Laser Therapy and Photobiology Center of the Universidade do Vale do Paraíba (UNIVAP), in São José dos Campos, São Paulo, Brasil, following approval from the UNIVAP Research Ethics Committee, under protocol No. 1.610.060, on 24/06/2016. Prior to starting treatment, the patient was informed of all the treatment steps and the subsequent description of the clinical case for possible publication. She was invited to sign a Free and Informed Consent Form that guaranteed the safeguarding of her identity and her right to withdraw from the study at any time.

A female patient, aged 61 years, 56kg, 1.67cm tall, born in São Paulo, Brazil, currently residing in the state of Florida, USA, who had refused the use of licit and/or illicit drugs, sought the Laser Therapy Center on October 27, 2015 with complaints of intermittent neuralgia and peaks of intense pain (level 10, according to the analogue pain scale). She described the first symptoms of the disease (severe neuralgia) as having occurred in June 2015 and was diagnosed with HZ on September 4, 2015. The clinical picture of intense neuralgia was maintained.

When she sought the Laser Therapy Center the patient was undergoing the same treatment as prescribed at the time of diagnosis: acyclovir
(400 mg, orally, five times a day for seven days), gabapentin (300 mg every 12 hours) clonazepam (0.5 mg every 12 hours), tramadol (50 mg orally every 12 hours) and dipyrone (500 mg orally every 8 hours) to aid in the treatment of HZ and PHN, without significant effects according to the patient's reports. She complained of neuropathic pain in the long thoracic nerve tract, a site previously proliferated by vesicles characteristic of HZ.

The irradiations were performed by legal and technically qualified professionals using lab coats, goggles, gloves, hats and masks (Figure 1). Sterile gauze soaked in 70% alcohol was used to remove soils from the irradiated site to improve light penetration into the tissue. The apparatus was coated with clear plastic to prevent possible contamination.

Laser therapy was performed at 20 points around the herpesvirus nerve, with a distance of 2cm between each point. The demarcation of the points on the skin was performed with the aid of a hypoallergenic long-lasting, moisture resistant pen. The measurement of the distance between the points was performed with a ruler. Irradiation was performed by the transcutaneous technique (direct contact with the skin), for 20 seconds at each point, with energy of 3J/cm² per point, total energy of 60J and a beam area of 0.5cm². The laser device used was a cluster of five GaAlA lasers (Clean Line, Brazil) with a wavelength of 654 nm (red) and power of 200mW.

Ten laser therapy sessions were instituted, with two irradiations per week. At the final stage of treatment (the last three irradiations) only one irradiation per week was performed. Pain level⁸,⁹ (Table 1), quality of life (Table 2) and sleep pattern were assessed at each session to accompany the therapy. The pain level was evaluated based on the Analog Pain Scale⁸, sleep pattern was evaluated based on a guiding question about the quality and quantity of sleep hours, while quality of life was evaluated through the SF-36¹⁰.

The guiding question was used to evaluate, in each session of the photobiomodulation, the quality and quantity, in hours, of sleep. At the beginning of the treatment (until the third session) the patient reported a maximum of three hours of sleep under the effect of medication (gabapentin, clonazepam and tramadol). In the interval between the fourth and seventh LIL sessions there was a significant improvement in sleep patterns (about five to six hours of deep sleep). Between the eighth and tenth photobiomodulation sessions there was stabilization in sleep patterns, with about eight hours per day of deep sleep.

![Figure 1](image). Low intensity laser irradiations. São José dos Campos, São Paulo, 2016.
The varicella-zoster virus (VZV), a member of *Herpesviridae*, is a highly contagious virus with major neurotrophic potential and which can infect only humans. Herpesviruses have the ability to induce latency in infected organisms and can therefore be reactivated at any time\(^\text{11,12}\). HZ is due to the reactivation of VZV, which remains latent in the sensory or cranial nerve ganglia after primary infection\(^\text{12}\). Primary infection by VZV occurs through the inhalation of aerosols when the virus comes into contact with the mucosa of the upper respiratory system and/or the conjunctiva\(^\text{13}\).

HZ transmission, meanwhile, occurs through direct contact with the injured areas of infected individuals. The most common complications of HZ are neurological and ophthalmologic impairment and NPH, which occurs most frequently\(^\text{2,13}\).

NPH, which involves pain that lasts after the rash is removed, can continue for many months or even years and may be severe, interfering with the sleep and quality of life of patients\(^\text{2,12}\).
The recommended treatment is with antiviral medications, the most common of which are aciclovir, valaciclovir and fanchlovir. These three drugs have proven effective at reducing the formation of new lesions, accelerating the resolution of existing lesions and reducing the intensity of acute pain. Valaciclovir and fanchlovir appear to be more effective in the treatment of HZ than acyclovir.2,14

While there is consistent evidence that oral acyclovir is ineffective in reducing the incidence of NPH, there is insufficient evidence for the recommendation of other antivirals for this purpose14.

Pain is a common complication of HZ, and its management varies according to its intensity and duration and the characteristics of the patient. Opioids are usually used for more intense pain, while for mild pain non-steroidal anti-inflammatory drugs can be administered. Pruritus is also a common symptom, and can be treated with the use of calamine14,15.

Medications recommended to minimize the severe pain associated with NPH include tricyclic antidepressants (amitriptyline, nortriptyline and imipramine), anticonvulsant agents (gabapentin and pregabalin), opioids, topical lidocaine (lidocaine patch), and capsaicin. Combined therapies with anticonvulsants and tricyclic antidepressants, or with opiates and anticonvulsants, have been shown to be more effective than monotherapy. However, even in these cases the pain may remain16.

Conventional antiviral, antidepressant, anticonvulsant, opiate and anti-inflammatory therapy, however, is not completely effective in treating signs and symptoms caused by VZV in HZ. LIL, therefore, is studied as an alternative treatment modality and/or coadjuvant9,16.

A review carried out with 11 scientific studies demonstrated the potential of LIL as a viable means for the treatment of HZ, since there was a significant reduction in the main complications (pain, sleep and rest) related to NPH17,18. However, in order to be properly used and to achieve satisfactory results it is essential to understand the technique, its operating principle, HZ itself and the peculiarities intrinsic to each patient9,19,20.

CONCLUSION

Photobiostimulation treated the discomfort of pain, improved the quality of life of the patient and proved to be an effective, safe and promising treatment, with potential to become the therapy of choice in such cases. Therefore, the photobiostimulation protocol adopted in this case report was effective and demonstrated its therapeutic capacity in neuralgia. With the aim of standardizing the parameters of photobiostimulation used in this study, further research involving more participants is recommended.
REFERENCES


