Treatment of Postherpetic Neuralgia Using Narrow Band Ultraviolet B Radiation (UVB)

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ABSTRACT

Postherpetic neuralgia (PHN) is a common complication of herpes zoster, frequently unresponsive to most available treatment. The disease is especially difficult to manage in elderly people and has a great impact on the quality of life of patients.

Narrow band ultraviolet B radiation may play a role in the prevention and treatment of PHN. Present paper describes a case of a 59 year-old female patient, diagnosed with ophthalmic herpes zoster and postherpetic neuralgia, with positive results using narrow UVB.

Keywords: herpes zoster; postherpetic neuralgia; narrow UVB; complications

INTRODUCTION

Herpes zoster (HZ) or shingles is a neurocutaneous disease caused by reactivation of latent varicella-zoster virus (VZV) (1). VZV is a deoxyribonucleic acid (DNA) virus that belongs to the human alpha-herpes viruses, together with herpes simplex viruses (HSV) type I and type II. VZV is the causal agent of chickenpox (varicella) especially in children and herpes zoster in elderly and immunocompromised individuals.

The prevalence of herpes zoster infection is reported to be between 0.3–0.5% (2).

After the initial phase of varicella, VZV remains dormant in the sensory ganglia for a latency period (months-years) before it reacts. At a certain moment, when the host resistance drops below a critical level, VZV reactivates and virus replication starts. VZV spreads down the sensory nerve causing neuritis and extends around the sensory nerve into the skin inducing dermatomal zoster skin lesions.

Frequently reported complications include: bacterial infections and consequent scars for skin, conjunctivitis, episcleritis/scleritis, uveitis, keratitis, iridocyclitis for eyes, and encephalitis, meningitis, granulomatous arteritis, segmental paresis affect the central nervous system (3).

Zoster pain is classified in acute pain and postherpetic neuralgia (PHN). The actual definition of PHN is: pain that persists for more than three months after the onset of herpes zoster (4).
PHN has been reported in 9-45% of all cases of herpes zoster (HZ) and even higher (50-60%) among elderly or immunosuppressed patients.

For a long time solar ultraviolet (UV) radiation (heliotherapy) and phototherapy have been used in order to attempt treating several skin diseases. Nowadays, phototherapy is a valuable therapeutic method used in numerous skin diseases (5), including HZ (6).

CASE REPORT

A 56-year-old female patient was addressed to the Department of Dermatology for erythematous plaques distributed over left upper hemifacial area. Three months prior to consultation, the patient was diagnosed with ophthalmic zoster and treated with acyclovir (800 mg five times /day for 10 days).

The dermatological examination revealed erythematous skin lesions accompanied by intense pain on the left upper hemifacial area. The patient admitted an increasing intensity of pain during the weeks that followed the herpes zoster.

A diagnosis of postherpetic neuralgia (PHN) was established.

A special therapeutic approach to the patient was recommended: nbUVB (narrow band UVB-311-Dermalight) - 3 sessions per week, up to a total of 20 sessions, performed at the Trychoderm Clinic in Slupsk, Poland under strictly medical surveillance.

The starting dose was 0.21 J/cm², then the dose was increased by one increment every session to a point of 20 sessions, in the absence of any adverse reactions reported by the patient, such as persistent erythema, burn or itching.

The patient was graded with regard to her pain severity using a 4-point Verbal Rating Scale (VRS):

0 = no pain,
1 = mild pain that does not interfere with daily activities
2 = moderate pain that interferes with daily activities, but does not cause sleeplessness
3 = severe pain that causes sleeplessness
4 = very severe, unbearable and extremely incapacitating pain.

The patient was subjectively evaluated regarding the pain index and degree of improvement once weekly. VRS was scored before the treatment and at the end of nbUVB sessions. VRS was also used for close follow-up of the patient at 2 months follow-up.

Before treatment the score was 4.

At the end of third session the score was 3, after 7 sessions 2, after 14 sessions 1 and at the end of cure: 0.

The score remained 0 one month after the therapy ceased and remained at that level for two month.

DISCUSSION

About 20-25% of cases of HZ develop PHN as a secondary complication, beside bacterial superinfection (7).

Postherpetic neuralgia (PHN) is considered to be a chronic neuropathic pain that involves aberrant somatosensory processing in the peripheral and/or central nervous system (1).

PHN can also be defined as the pain lasting for more than 1-3 months or even years after the onset of herpes zoster (8). One report claims that 15% of HZ cases have PHN 2 years after the zoster rash (9).

Known risk factors for PHN include: advanced age, female gender, chronic debilitating diseases, immunocompromised condition, and a severe acute phase of HZ (10).

Patients with HZ have a lower incidence of PHN in the age group below 60 compared to the ones over 60 (11).

PHN has been recently found in higher incidence in patients after traumatic brain injury (12).

HZ vaccination has been reported with a lower risk of PHN in women, not in men ac-
Accordingly to a very recent study, but further investigations are needed (13).

The exact pathogenesis of zoster pain still remains debatable, but it is admitted to be mostly immunologically mediated (1), especially VZV-specific cell-mediated immunity (14).

PHN is described by the patients as burning, itching, and even stabbing, localized to the dermatomal area with preceding herpes zoster skin lesions. Pain can be associated with sleep disturbance, depressive symptoms; can be paroxysmal or continuous, with variable degrees and can affect deeply daily social activities.

Treatment of PHN is difficult because the majority of cases are unresponsive to most available treatment modalities.

Oral treatment for PHN can include:
- tricyclic antidepressants (acting by blocking sodium, calcium and NMDA receptors and by inhibiting serotonin and nor-epinephrine reuptake) (15).
- opioids analgesics (acting as mu-receptor agonists) (16).
- and anticonvulsants: gabapentin and pregabalin (blocking calcium channels in neurons) (17).
- NSAIDs, oral steroids.

Topical agents have been used, during the last decades, for PHN: local anesthetics (topical lidocaine by blocking voltage-gated sodium channels)(18), topical capsicain (affecting the TRPV1 receptor and producing depletion of substance P which is a neurotransmitter) (19), diclofenac, clonidine, gabapentin, opioids (20), topical amitriptyline (21), topical or intranasal ketamine (22), local injections of botulinum toxin type A (23), all with unimpressive effects especially on long term evolution.

Ultraviolet B (UVB) phototherapy was used for the first time in two studies done by Jalali et al. in 2008 and respectively by Nabarawy in 2011 as an attempt to treat PHN (1,8).

Nabarawy enrolled in the study 17 patients with distressing PHN; patients were evaluated using the Verbal Rating Scale (VRS). The patients received nbUVB sessions, three times a week, for a total of 15 sessions or until the pain disappeared. As results more than 50% improvement was achieved in 6 (35.29%) and 8 (47.06%) patients, at the end of therapy and after 3 months follow up, respectively. An improvement less that 50% was achieved in 11 (64.71%) and 9 (52.94%) patients, at the end of therapy (1).

Jalali et al. described the evolution of 12 patients older than 40 years, with PHN treated with nbUVB phototherapy. The group received oral acyclovir (800 mg five times a day for 10 days) plus nbUVB to the affected dermatomes, during the first 7 days of rash, starting with 20 mJ/cm² then gradually increasing the dose by 10 mJ/cm² each session to a maximum dose of 100 mJ/cm². Sessions were repeated three times a week until pain relief or to a maximum of 15 sessions. A percentage of 58.33% and 83.33% of treated patients were completely pain free at at one and three months follow-up, respectively (8).

UVB radiation reaches the epidermis and the upper dermis, while UVA radiation penetrates more deeply into the dermis, with effects on blood vessels, dendritic cells, fibroblasts, mast cells, granulocytes. Narrowband UVB (nbUVB) causes local and systemic immuno-suppressive effects by activating keratinocytes, circulating and cutaneous T lymphocytes, monocytes, Langerhans cell, mast cells and fibroblasts (6).

The immunomodulatory effects of UVB radiation can explain, at least in part, the beneficial effects observed in HZ (1,8).

Many hypotheses have been launched in order to explain the mechanisms induced by UVB in PHN. UVB phototherapy can suppress the inflammatory response during the acute phase of HZ and thus preventing or decreasing the intensity of PHN, but applied 3 months after the onset of HZ the beneficial effect is low (8).

UVB phototherapy can also have a positive effect by decreasing the neuronal damage in HZ, contributing also to improve PHN.

UVB can interact with Langerhans’s cells that are believed to be involved in inducing neuritis and play a role in immune response (24).

UVB also suppresses antigen presentation of LCs, stimulates keratinocytes and mast cells to secrete immunosuppressive cytokines such as IL-10, TNF-α, IL-4, PG-E2, α-MSH or CGRP (25), modifies the T-cell response to persistent VZV particles in nerve fibers (26), induces a shift from a Th-1 immune response to a Th-2 response (1), reduce the cutaneous nerve density in the epidermis and superficial dermis (27).

In present case nbUVB proved to be effective in PHN, when it was performed three
months after HZ. The absence of pain persisted 2 months after the last nbUVB session. No side effects were reported neither during therapy nor after the treatment, all sessions were well tolerated.

CONCLUSION

Promising results have been achieved using nbUVB in postherpetic neuralgia, but more studies are needed to conclude its real beneficial in such a debilitating complication of herpes zoster such as PHN, especially in elderly. It is a non-invasive, easy to perform, not very expensive, with minimal side effects valuable method to be aware of.

Further studies are needed to validate the indication of nUVB in PHN.

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REFERENCES