Case Report

Efficacy of Limited-Duration Spinal Cord Stimulation for Subacute Postherpetic Neuralgia

Masako Iseki,[1]MD, PhD, Yoshihito Morita,[1]MD, Yoshitaka Nakamura,[1]MD, Masataka Ifuku,[1]MD, Shuji Komatsu,[1]MD

Abstract

Excellent outcomes were achieved with spinal cord stimulation (SCS) for 7 to 10 days on 2 patients who developed postherpetic neuralgia. Both patients were within 2 to 3 months of the onset of the condition, and nerve blocks provided only temporary pain relief and drug therapies had poor efficacy. The authors believe that limited-duration SCS for subacute postherpetic neuralgia is a useful treatment approach that may prevent the pain from progressing to chronic postherpetic neuralgia.

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Introduction

Peripheral and central sensitisation of the nervous system through prolonged pain is commonly believed to be a mechanism responsible for facilitating the development of chronic pain. This suggests the importance of suppressing the sensitisation at the earliest possible stages of the pain process.[1] From this perspective, spinal cord stimulation (SCS) therapy may effectively prevent establishment of chronic pain.

We present 2 patients with subacute postherpetic neuralgia (PHN) who received SCS for a short duration (termed "limited-duration SCS" herein; or may be expressed as "temporary SCS" in other publications). Both patients have been suffering from PHN for 2 to 3 months.

Case 1

The patient was a 71-year-old female with diabetes. She developed herpes zoster involving the right T3 dermatome. Although she was prescribed with an anti-viral drug valacyclovir and later with non-steroidal anti-inflammatory drugs (NSAIDs) and a sleep aid, pain did not decrease at all, forcing her to wake up many times at night. When she visited our pain clinic 2 months after the onset of the herpes zoster, her Visual Analog Scale (VAS) score was 80 mm on a 0-100 mm scale with both continuous and lancinating pain. She was suffering from allodynia and hypoaesthesia, making it difficult for her to continue her employment. Oral administration of 600 mg/day of gabapentin and 10 mg/day of amitriptyline did not improve her VAS score after 10 days of treatment. She did not wish to increase the dose or switch to other drugs after experiencing drowsiness from her treatment. She was admitted for a continuous epidural infusion with a local anaesthetic (0.2% ropivacaine at 2 mL/h). While the VAS improved to 20 mm during the infusion, discontinuation of the infusion after 1 week of treatment resulted in return of pain to VAS 80 mm. In order to elucidate the mechanism of pain, a series of intravenous drug-challenging tests was conducted with barbiturate (to find if the pain is of central origin), morphine (nociceptive), ketamine (spinal cord) or lidocaine (peripheral).[2] In these tests, barbiturate and ketamine were effective, while lidocaine and morphine were not. Based on this result, we anticipated an alleviative treatment on the spinal to central nerve level would be useful, and suggested to the patient that SCS might be a non-drug treatment option. After obtaining informed consent, we decided to try limited-duration SCS on her. We first performed an epidural puncture with a 17G epidural needle at the lower thoracic vertebra and then inserted a Medtronic™ Pisces Quad lead into the epidural space. In order to provide sufficient coverage to the entire painful area, we had to insert one lead medially into the epidural space with its tip located over the centre of T1 and the bottom end over the upper edge of T3, and the other lead

[1] Juntendo University School of Medicine, Department of Anesthesiology and Pain Medicine, Tokyo, Japan
Address for Correspondence: Dr Masako ISEKI, Juntendo University School of Medicine, Department of Anesthesiology and Pain Medicine, 3-1-3, Hongo, Bunkyo-ku, Tokyo, Japan 113-0033.
Email: m_iseki@mbr.nifty.com

toward the right of T2 with its tip over the upper edge of T2 and the bottom end over the center of T3 (Fig. 1). The leads were affixed to the patient's skin to avoid accidental removal and the entire area was covered with a piece of dressing tape to prevent infection. While the patient was allowed to control the actual duration and frequency of the stimulation, she chose to provide herself 1 to 2 hours of the stimulation several times a day. Her VAS score improved to 10 mm during the SCS sessions, and gradually her pain was reduced even during intervals without SCS. The 4th contact from the top on the right-sided lead was set as positive (+) while the 3rd contact from the top on the midline lead was set as negative (-). The pulse-width was 210 ms at 3.0 V/15 Hz. The allodynia disappeared, and when the leads were removed after 1 week of the treatment, her VAS score was maintained between 10 and 20 mm. Upon hospital discharge the following day, she was prescribed with 300 mg/day of gabapentin and 10 mg/day of amitriptyline. At 1-month follow-up, amitriptyline was discontinued. She has not complained of worsening pain since then, and the VAS score after 1 year of treatment was 10 mm with 300 mg/day of gabapentin.

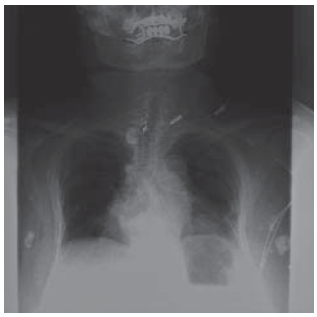

Fig. 1. X-ray of Case 1 with dual leads.

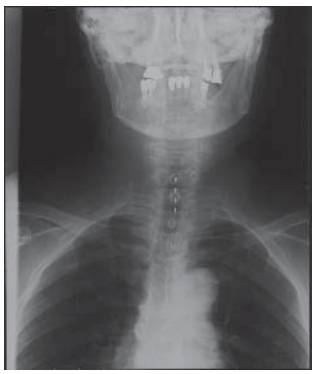

Fig. 2. X-ray of Case 2 with single lead.

Case 2

The patient was a 72-year-old female with hypertension. She was diagnosed with herpes zoster involving the left thoracic T3 and T4 dermatomes. After 2 months of treatment with valacyclovir, NSAIDs and amitriptyline, she was referred to our pain clinic for further treatment. She had severe pain with a VAS score of 83 mm, forcing her to wake up several times at night. Both allodynia and hypoaesthesia were observed. Oral administration of 600 mg/day of gabapentin resulted in dizziness and drowsiness, and 100 mg/30 minutes of intravenous lidocaine infusion did not provide pain relief. In response to the patient's desire to switch from drug therapy to other interventional pain therapies, she was hospitalised to receive 1 week of a continuous epidural infusion with a local anaesthetic (0.2% ropivacaine 2 mL/h) as well as third and fourth thoracic nerve root blocks to the affected nerve with a local anaesthetic (3 mL of 2% mepivacaine per site) and steroid (4 mg of dexamethasone per site), resulting in alleviation of night and breakthrough pains. As her continuous pain was not alleviated, we decided to use limited-duration SCS after obtaining patient's consent. After an epidural puncture in the mid-thoracic level, a Medtronic™ Pisces Quad lead was placed medially in the epidural space with its tip over the lower edge of the seventh cervical vertebra and the bottom end over the upper edge of T2, which provided stimulation to the entire painful area (Fig. 2). While the patient was allowed to control the duration and frequency of the stimulation, she chose to provide herself 30 minutes to 1 hour of stimulation approximately 10 times a day. The topmost contact on the lead was set as positive (+) while the 3rd contact was set as negative (-). The pulse width of 210 ms at 6.0 V/5 Hz covered the painful region completely. Her VAS scores improved to 10-20 mm during the stimulation. After a few days of SCS, her allodynia disappeared even during the intervals when no stimulation was provided. Her pain gradually subsided, and the VAS score improved to 38 mm when the lead was removed after 10 days of treatment. Upon discharge from hospital the following day, she was prescribed with 300 mg/day of gabapentin. Her VAS score 1 month and 1 year later were 20 mm and 15 mm respectively. She continued with 300 mg/day of gabapentin only.

Discussion

In this report, we presented 2 subacute PHN cases within 3 months of the onset of herpes zoster, in which limited-duration SCS was effective in alleviating the pain. Increasing drug dosages or switching drugs was difficult because both patients were elderly. Although the continuous epidural infusion with topical anaesthetic was effective, its effect was only temporary and the use of anaesthetic agents was associated with sympathetic and motor blockade. On the other hand, SCS does not limit patients' daily activities and does not lead to major haemodynamic changes. The authors speculated that the excellent outcome with the limited-duration SCS was possible because the therapy provided strong suppression of the spinal cord during the critical time period when the acute herpetic pain progressed to postherpetic neuralgia. The targets of such suppression

might have included the spinal dorsal horn wide dynamic range (WDR) neurons as well as nociceptive input from the peripheral nerves.[3]

There was a possibility that these patients would progressively recover from pain without the SCS intervention as PHN is generally defined as pain persisting after 3 to 6 months from the onset of herpes zoster. However, such a likelihood was fairly low considering the fact their VAS scores were as high as 80 and 83 mm after 2 months from the onset of the disease. While opioid treatment could be an option,[4] intravenous morphine was ineffective in the first patient, and the second patient refused opioid treatment because of its potential side effects.

Harke et al[5] reported that the use of SCS within 0.5 to 2 months from the onset of herpes zoster improved VAS scores to zero, and the patients could complete the therapies in 2.5 months. Responses in PHN patients were not uniform, however, as some patients still had pain after 29 months of the treatment. Moriyama et al[6] also proposed to utilise SCS for approximately 2 weeks without permanent implantation of the pulse generator. They showed that patients who were within 3 months from the onset of herpes zoster achieved pain relief. Kumar et al[7] reported that early intervention with SCS provided better pain relief as well as longer periods of effective control. In addition, long-term pain alleviation and patient satisfaction were superior when the SCS therapies were started earlier.[8] In another report, the cost-effectiveness of the SCS was not found to be inferior compared to drug therapies.[9]

In conclusion, limited-duration SCS treatment in the early stages of subacute PHN is highly meaningful as it may prevent progression to chronic postherpetic neuralgia. SCS may be particularly useful in patients who do not obtain pain relief with antidepressants, anticonvulsants or opioids.

The risk of infection still exists with implanted leads. However, the procedure is minimally invasive requiring only epidural puncture without implantation of a pulse generator. If the SCS achieves excellent pain relief, no drug therapies will be required, which further reduces the risk associated with the overall treatment. In clinical practice, the limited-duration SCS should be employed only after the patient is provided with information on all possible treatment options as well as the benefits, shortcomings, potential risks and economical considerations of the SCS.

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