

# Intrathecal Dexamethasone For The Treatment Of Intractable Postherpetic Neuralgia: A Case Report

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## Abstract

Postherpetic neuralgia (PHN) is a debilitating chronic pain condition that affects approximately 25% of patients after herpes zoster infection. Despite many pharmacologic treatments for PHN, some patients continue to suffer from intractable pain. Intrathecal administration of methylprednisolone has been reported to be an effective treatment for PHN.

We describe our first successful case of treating intractable PHN in a 73 year-old patient after three consecutive weekly intrathecal administration of dexamethasone. He failed to obtain pain relief with drug therapy including antidepressants, anticonvulsants and opioids. At six months follow up, patient continued to have good symptom relief with 70% reduction in pain and resolution of allodynia.

## INTRODUCTION

Postherpetic neuralgia (PHN) is a debilitating chronic pain condition that affects approximately 25% of patients after acute herpes zoster infection. Tricyclic antidepressants, anticonvulsants and topical agents such as lidocaine patches have been used with good efficacy in the treatment of PHN.<sup>1,2,3</sup> However, a small percentage of patients with intractable PHN continue to have severe pain that is resistant to most drug therapy.

We describe a case of intractable PHN in a patient who reported reduction in pain after three consecutive intrathecal dexamethasone injections at weekly interval.

## CASE REPORT

A 73 year-old Chinese male presented to the Pain Clinic with a six-year history of PHN. He developed herpes zoster affecting the left chest and upper back in 2002. After resolution of herpes zoster infection, he continued to suffer from severe pain over the area. Pain was described as constant, sharp, pulling and burning in nature. Pain was also aggravated by touch, wearing clothes and showering. Pain was 10/10 on a Numeric Rating Scale (with "0" being "no pain" and "10" being the "worst possible pain"). Physical examination revealed hyperpigmentation and scarring over T1 and T2 dermatomes at the left anterior chest and left upper back. There was associated allodynia, thermal and

mechanical hyperalgesia. Other past medical history included coronary artery disease and asthma. He had undergone coronary artery bypass surgery in 1983 and 2005.

Since the development of PHN, this patient had been prescribed various medications including tramadol, amitriptyline, nortriptyline, carbamazepine, gabapentin, pregabalin and duloxetine but none helped with alleviating his pain. Topical local anesthetic cream and capsaicin were also tried without success. More recently, opioids including morphine, oxycodone and methadone were prescribed for this patient but he experienced intolerable side effects such as nausea, vomiting, dizziness and drowsiness. Acupuncture was tried with no improvement in symptoms as well. This patient had also received two cervical epidural steroid injections in August 2006 and October 2006. However, his pain persisted. As a consequence, the patient was offered three consecutive intrathecal steroid injections at weekly interval.

On 23 January 2008, the first injection was performed. After obtaining informed and written consent, the patient was placed in the left lateral position with the painful side dependent. After local infiltration with 3 ml of 1% lidocaine, the T1-2 interspace was identified. A 27-Gauge Whitacre spinal needle was inserted until the needle tip entered the intrathecal space. Clear cerebrospinal fluid was observed to

flow freely. Then 1 mg of 0.5% hyperbaric bupivacaine (0.2 ml) and 4 mg of preservative-free dexamethasone was injected. Patient reported immediate pain relief over his painful site. He was maintained in the left lateral position for 30 minutes. The second and third injections were then performed one and two weeks after the first injection respectively. All three procedures were performed uneventfully. There was no significant hypotension, bradycardia or other adverse effects after each procedure.

When the patient was reviewed two weeks after the last injection, he reported 70% reduction in pain, especially over the left posterior chest. There was some residual hyperalgesia over the left anterior chest but it was not bothering him as much as before. At six months follow-up, he continued to have good pain relief. He was only maintained on nortriptyline 25 mg ON.

### **DISCUSSION**

Despite advances in antiviral therapy during acute HZ, PHN continues to be a significant clinical problem with up to 25% of patients developing persistent neuropathic pain after acute HZ reactivation.<sup>1,2,3</sup> Epidemiological data indicates that vulnerability to developing PHN and chronicity or severity of pain are strongly linked to age, with older patients at much greater risk than young individuals.<sup>2,4,5</sup>

Therapies that have been used to treat PHN include oral anticonvulsants (e.g. gabapentin, pregabalin), tricyclic antidepressants (e.g. amitriptyline, nortriptyline), opioids as well as topical agents (e.g. lidocaine patch, capsaicin cream). Polypharmacy is not uncommon due to limited efficacy of monotherapy.<sup>6</sup> Consequently, invasive treatment including peripheral nerve blocks, sympathetic blocks, epidural and intrathecal injections as well as spinal cord stimulation have been attempted and reported in the literature.<sup>1,3,7</sup>

We report a case involving a patient with intractable PHN involving the left T1 and T2 dermatomes. In this case, initial therapy with oral medication and topical agents were unsuccessful as the patient either had no pain relief or experienced intolerable side effects. Neither acupuncture nor epidural steroid injection reduced his pain. Significant pain reduction was achieved after three consecutive intrathecal injections of dexamethasone 4 mg with 0.5% hyperbaric bupivacaine 1 mg at T1-T2 level at weekly intervals.

Kotani and colleagues performed a randomized controlled trial to assess the benefit of intrathecal methylprednisolone for the treatment for PHN. They showed that the addition of

steroids to local anesthetic intrathecally produced good to excellent pain relief in patients with refractory PHN. In addition, pain relief lasted for at least two years, and the therapy did not produce any adverse effects.<sup>8</sup> Kikuchi and colleagues found that administration of local anesthetics with methylprednisolone was more effective intrathecally than epidurally, resulting in pain reduction by more than 50%.<sup>9</sup> We performed three injections based on the study by Kotani and coworkers. However, We administered dexamethasone and bupivacaine at the affected level (i.e., T1-2) so that medication could be delivered directly to where the problem was. Kotani and coworkers administered intrathecal medication at L2-3 intervertebral space. We also used hyperbaric bupivacaine so that we can deliver immediate pain relief and obtain confirmation of the correct level.

The risk of arachnoiditis after intrathecal steroid administration remains controversial. There have been several reports of arachnoiditis among patients treated with multiple intrathecal steroid injections.<sup>10,11,12,13,14,15</sup> In these reports, methylprednisolone acetate was the compound most often used. It was possible that the preservatives in the methylprednisolone preparation – the non-ionic detergent polyethylene glycol and benzyl alcohol – lead to arachnoiditis, as they are potential neurotoxins.<sup>16</sup> The dexamethasone preparation we used was a non-particulate steroid and it was preservative free. Kroin and colleagues studied the pharmacokinetics and neurotoxicity of chronic intrathecal administration of dexamethasone sodium phosphate in an animal model and found that dexamethasone sodium phosphate is a stable prodrug that is efficiently converted to free dexamethasone.<sup>17</sup>

The impressive pain relief that resulted from intrathecal administration of dexamethasone was presumably due to the anti-inflammatory action of steroids. High concentrations of interleukin-8 (IL-8) in the cerebrospinal fluid of patients with PHN before treatment were consistent with a prolonged spinal inflammatory reaction.<sup>8</sup> Studies have shown that corticosteroids inhibit the activity of IL-8 and decrease IL-8 concentration, and this decrease correlated with the degree of pain relief.<sup>18,19</sup>

It is also possible that corticosteroids work by stabilizing neural cell membranes and suppress ectopic discharge from C-fibers. Allodynia, which is due in part to increased excitation of injured C-fibers, was eliminated because corticosteroids attenuate peripheral C-fiber activity, thereby

suppressing hyperexcitability of the CNS.

In conclusion, we describe the first case of treating intractable PHN successfully with three consecutive weekly intrathecal administration of preservative-free dexamethasone and hyperbaric bupivacaine at the level of pathology. Pain relief was sustained at six months post-procedure. We do not recommend this as standard therapy for PHN and further randomized controlled trials and larger scale studies are needed to confirm and establish the efficacy of intrathecal dexamethasone in the management of PHN.

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