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Administration of Vitamin C in a Patient with Herpes Zoster
- A case report -

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Herpes zoster as a result of reactivated varicella-zoster virus is characterized by vesicular eruptions on skin and painful neuralgia in the dermatome distribution. Pain during an acute phase of herpes zoster has been associated with a higher risk of developing postherpetic neuralgia. The current therapies for herpes zoster including analgesics and sympathetic nerve block as well as antiviral agents are important to alleviate pain and prevent postherpetic neuralgia. However, in some cases, the pain does not respond well to these treatments. We had a case in which a patient with herpes zoster did not respond to conventional therapy so we attempted to administer intravenous infusion of vitamin C which resulted in an immediate reduction in the pain. (Korean J Pain 2011; 24: 108-111)

Key Words:
herpes zoster, postherpetic neuralgia, vitamin C.

Herpes zoster (HZ), commonly called shingles, is a localized disease that results from the reactivation of the varicella-zoster virus that persists in a latent form in the dorsal root ganglia. It is characterized by vesicular eruptions in the dermatome distribution followed by painful neuralgia [1].

HZ may progress to postherpetic neuralgia (PHN) which is defined as pain along the cutaneous nerves persisting for more than 30 days after the lesions have healed. It is very difficult to manage PHN which negatively impacts quality of life [2]. Therefore this complication is the most conclusive reason to treat HZ. The current therapies for HZ include analgesics and sympathetic nerve block as well as antiviral agents [3,4].

Recent published reports show that the infusion of vitamin C was effective in zoster-associated neuralgia [5,6]. In addition, it was reported that intravenous infusion of vitamin C improved HZ [7]. In our case report, we described a patient with HZ who reported an immediate reduction in pain after intravenous administration of vitamin C.

CASE REPORT

A 67-year-old woman presented with a 10-day his-

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tory of localized zoster in the right occipital area. Skin rash developed on the right occipital area of the second and third cervical dermatome. Three days after the appearance of the rash, she was diagnosed with HZ by a dermatologist and was prescribed 5 mg of oxycontin twice a day, 650 mg of acetaminophen twice a day, 75 mg of pregabalin twice a day, and 500 mg of famciclovir 3 times a day, for 7 days, respectively. In spite of the 7-day administration of these medications, her pain was rated at an intensity of 7 on the visual analogue scales (VAS) from 0 (no pain) to 10 (worst pain imaginable) at first visit to our department. She suffered from constant aching pain along with intermittent, spontaneous, sore and shooting pain over the right occipital area, which was provoked by brushing.

Therefore, right stellate ganglion block (SGB) using 7 ml of 1% lidocaine with ultrasound was performed but it did not reduce the symptoms. 30 minutes after SGB, 2 g of vitamin C was administered intravenously, but it also did not alleviate her pain.

On the second day, a second attempt of right SGB was performed without any reduction in pain. 30 minutes after SGB, 4 g of vitamin C was administered intravenously, and then, the patient reported immediate pain relief from a VAS of 7 to 2. During the first 12 hours, intermittent shooting pain and constant aching pain were maintained at a reduced intensity, but constant aching pain increased to a VAS of 5 again after 12 hours, while shooting pain remained constant at a VAS of 2. On the third day after right SGB, the pain did not decrease in intensity. But 30 minutes after SGB, 4 g of vitamin C administered intravenously sequentially reduced the constant aching pain from a VAS of 5 to 2, which was maintained for about 12 hours. However, there was no intermittent shooting pain after the administration of the vitamin C on the third day. On the fourth day, right SGB and sequential intravenous injection of 4 g of vitamin C was done just like before. Immediately after the administration of the vitamin C, she rated her pain intensity from a VAS of 4 to 1, which was maintained for about 12 hours. On the fifth day, intravenous injection of 4 g of vitamin C was done without SGB. Immediately after the administration of the vitamin C, she rated her pain intensity from a VAS of 4 to 0. Since then, her pain intensity has been maintained at a VAS of 0-1. The administration of 5 mg of oxycontin twice daily and 650 mg of acetaminophen twice daily was stopped. Then she was discharged with a prescription for 75 mg of pregabalin twice a day and 1 g of vitamin c twice a day. Five days after taking the pregabalin and vitamin C, she reported a complete resolution of the pain and stopped taking the medication. At 3 months follow-up, she continued to have no pain without any complications.

DISCUSSION

Herpes zoster is a result of the reactivation of the latent varicella-zoster virus within the dorsal root ganglia (DRG) or cranial nerve ganglia under various conditions related to a decrease in cell-mediated immunity [1]. Replication of the virus results in nerve injury and produces debilitating pain preceding the skin eruptions such as rashes or vesicles in the corresponding dermatome.

The most common complication of HZ is PHN, which is defined as pain persisting for more than a month after healing of the rashes from acute HZ. PHN is notoriously difficult to treat and often is accompanied by physical and social disabilities and even psychological distress [8].

The genesis of the pain during acute HZ is thought to be from inflammation and damage to the DRG and peripheral nerves. The inflammatory changes in the DRG can reduce intraneural blood flow, leading to hypoxia and endoneurial edema. This process finally causes neural injuries that can lead to the development of neuropathic pain. In addition, inflammatory changes in the dorsal horn produce nociceptor excitation and sensitization that cause central hyperexcitability [9,10]. In other words, uncontrolled persistent pain in acute phase may finally lead to chronic neuropathic pain; therefore, faster resolution of inflammation and pain is important [10].

The incidence of PHN increases with the increasing age of the patient. In this case, the 67-year-old patient was at risk of developing PNH. She received drug treatment including an antiviral agent, anticonvulsant, and analgesics. In addition to the drug therapies, SGB was tried for symptomatic relief in the acute phase of HZ and for the prevention of PHN [3]. Pregabalin medication has been shown to decrease significantly postherpetic neuralgia after the first day of treatment [11]. Our patient reported pain relief immediately after intravenous administration of vitamin C despite no relief after 7-days of administrating pregabalin and other drugs. Therefore, we presume that the vitamin C might be responsible for the pain relief.

Vitamin C is a first line plasma antioxidant in virus-specific cellular immunity. A community-based case control study revealed that those with low vitamin C intake were significantly at higher risk for HZ [12]. Plasma vitamin C concentrations have been suggested to be related to pain modulation for intractable PHN [5,6]. In addition, vitamin C has been reported to reduce the prevalence of complex regional pain syndrome (CRPS) after foot and ankle surgery [13]. Therefore, it has been proposed that it may be beneficial to supply and increase plasma concentrations of vitamin C for patients at high risk for CRPS [13,14].

The mechanisms of neuropathic pain like zoster-associated pain and CRPS include neuroinflammation, central sensitization, disinhibition, and reactive oxygen species (ROS) [15,16]. Recent studies have suggested that ROS which are produced from peripheral inflammation will sensitize nociceptors so that they not only respond more vigorously to noxious stimuli but also start to respond to normally subthreshold stimuli. This peripheral sensitization not only induces pain directly, but also induces central sensitization in the spinal cord, which indirectly contributes to pain as well. ROS which result from persistent abnormal afferent inputs produced in the spinal cord can lead to central sensitization, which in turn produces pain [17]. In other words, ROS have been suggested to contribute to the development and maintenance of neuropathic pain that can be relieved by systemic injection of ROS scavengers [16]. Therefore, an ROS scavenger such as vitamin C is suggested to be neuroprotective by scavenging excess ROS [13,14]. Vitamin C is an extracellular and intracellular antioxidant but also a major antioxidant in CSF [18], and its effect is concentration dependent [19]. Recently, previous reports showed that short-term intravenous administration of high-doses of vitamin C helped to reduce the pain in patients with PHN [5,6] and to treat patients with HZ [7].

The dosage of vitamin C in the literatures has varied. It was reported that 2.5 g of intravenous vitamin C reduced pain in a 78-year-old man with PNH [5]. In addition, 15 g of intravenous vitamin C was efficient in the treatment of two patients (females aged 67 and 53 years) with HZ [7]. In this case, intravenous administration of 4 g of vitamin C was effective to reduce the pain in our patient with HZ.

In conclusion, vitamin C may be an efficient adjuvant for multi-drug regimens to control pain in patients with HZ. Formal studies are required to determine whether treatment with vitamin C may prove useful in patients with HZ.

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