Successful Treatment of Herpes Zoster Ophthalmicus Complicated by Intense Orbital Inflammation Using Laser Irradiation over the Stellate Ganglion

Yoshifumi Ashikawa, Fumiko Kusunoki Nakamoto, Tatsuya Sato, Junko Katsumata, Taro Bannai, Tomonari Seki, Masako Takeda and Yasushi Shiio

Abstract:
A 56-year-old man presented with right-sided headache and ptosis accompanied by a facial skin rash. He was diagnosed with herpes zoster ophthalmicus (HZO). Despite acyclovir and steroid therapy, the ocular symptoms worsened. Magnetic resonance imaging (MRI) revealed severe orbital inflammation and abnormal lesions in the right trigeminal nucleus and tract. The effects of re-administration of intravenous acyclovir and steroid pulse therapy were limited. Laser irradiation of the stellate ganglion (SGL) and high-dose oral prednisolone therapy were effective. Our experience suggests the efficacy of early multimodal treatment, including SGL, in treating ocular symptoms associated with HZO.

Key words: herpes zoster ophthalmicus, ocular symptoms, stellate ganglion laser, stellate ganglion block, spinal trigeminal nucleus and tract

(Intern Med Advance Publication)
(DOI: 10.2169/internalmedicine.9503-22)
Eye movement examination findings. (a) At hospital admission. (b) After intravenous acyclovir therapy, steroid pulse therapy, and stellate ganglion laser irradiation.

Figure 1.
Figure 2. Orbital MRI. (a-c, g) Axial MRI. (d-f, h) Coronal MRI. (a-f) MRI on admission showing enlargement of the right external ocular muscles and irregular enhancement effects on the right internal and external orbital ocular muscles, perioptical nerve, and part of the intrafoveal lipid tissue. (g, h) MRI just before discharge revealed that the swelling of the right external ocular muscle had improved, and the abnormal signal in the right trigeminal nerve tract nucleus had become obscured. MRI: magnetic resonance imaging, STIR: short T1 inversion recovery imaging, T2WI: T2-weighted imaging, T1WI: T1-weighted imaging.

Figure 3. Axial brainstem MRI. (a-d) DWI on admission. (e-l) DWI and FLAIR images obtained 10 days after admission. (m-p) FLAIR images obtained at discharge. DWI: diffusion-weighted imaging, FLAIR: fluid-attenuated inversion recovery, STNT: spinal trigeminal nucleus and tract.

Discussion

The therapeutic course of the patient suggests that SGL is effective not only for pain management due to herpes zoster but also for external ophthalmoplegia. Several papers have reported that SGB can improve facial pain following herpes zoster infection (4). However, to our knowledge, there have been only three reports of improved oculomotor dysfunction after treatment of herpes zoster by SGB (5-7). We summarized the findings of the five cases in which SGB was effective for treating eye movement disorders caused by herpes.
zoster (Table). In these reports, there was no improvement with steroid pulse or oral prednisolone therapies; however, after SGB was performed three to eight times, improvements in oculomotor disturbance were observed. After further SGB, diplopia disappeared. Several patients in previous reports showed improvements in oculomotor disorders during SGB, using only pain control medications without steroid therapy (5-7).

How SGL contributed to the improvement of ocular symptoms in our patient is unclear. Movement disorders due to herpes zoster can occasionally improve spontaneously. However, this patient showed intense orbital inflammation, and if the treatment had not been initiated, he would have had severe visual sequelae. There is also a possibility that only steroid therapy was effective. However, the patient showed significant improvement after starting SGL. In a report of 18 cases of unilateral rather than bilateral ophthalmoplegia with ocular motor deficits in all 4 directions due to herpes zoster, ophthalmoplegia took an average of 4.4 months to disappear. Several patients had residual ophthalmoplegia despite antiviral drugs, or steroids, or a combination therapy with antiviral drugs and steroids (8). In our case, SGL was started four weeks after the onset, and the patient showed significant improvement in his ocular motility disorder five to six weeks after the onset. Based on the clinical course of the patient and previous reports, we propose that SGL itself was effective in improving ocular symptoms.

Previous papers have suggested that the therapeutic mechanisms involved in SGB and SGL are related to increased cerebral blood flow, which improves tissue ischemia (9, 10). SGB has been reported to increase the blood flow of the optic nerve head and the peripapillary retina (9), and SGL has been reported to increase the blood flow to the ophthalmic and central retinal arteries (10). SGL is less invasive than SGB and has been reported to have clinical efficacy similar to that of SGB (2, 3).

Several mechanisms underlying the oculomotor disorders in this patient have been proposed. The oculomotor nerve may first have been damaged by VZV, which is known to incubate in the trigeminal ganglion via the cavernous sinus, superior orbital fissure, and orbital apex. The trochlear and abducens nerves may have been affected by the invasion of VZV or the spread of inflammation. Inflammation and swelling of extraocular muscles and retrobulbar soft tissues can also cause oculomotor disorders. The effect of SGL on oculomotor disorders suggests ischemia caused by occlusive vasculitis.
In the present patient, abnormal signals were observed along the STNT. It was previously reported that 9 of 16 patients with herpes zoster in the trigeminal and cervical nerve regions had abnormal signals in the brainstem or cervical spinal cord on MRI (11). However, there have been only five case reports in which the entire STNT has been delineated. In these patients with herpes zoster, the STNT showed a high signal on T2-weighted images, and in several patients, the STNT also showed a high signal intensity on FLAIR or DWI (12-16). In the present patient, DWI at the time of admission showed a hyperintense lesion in the right lower medulla oblongata, possibly involving the STNT. Ten days later, the lesion had extended to the superior medulla oblongata. The first branch of the trigeminal nerve terminates in the caudal part of the spinal trigeminal nucleus, and it is speculated that the abnormal lesion spread from the caudal part of the STNT in a cephalad direction during the clinical course.

In summary, we encountered a patient with severe orbital inflammation secondary to herpes zoster ophthalmicus with high-intensity signals in the STNT on DWI and FLAIR MRI who demonstrated a good clinical response to SGL. Early multimodal treatment with SGL may be required in patients with HZO with severe orbital inflammation.

The authors state that they have no Conflict of Interest (COI).

References


The Internal Medicine is an Open Access journal distributed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view the details of this license, please visit (https://creativecommons.org/licenses/by-nc-nd/4.0/).