

A case of herpes zoster ophthalmicus with unilateral sixth cranial (abducens) nerve palsy

Sang Hee K Choi*; Yinglin Gao; James J Huang

***Corresponding Author: Sang Hee K Choi**

Loma Linda University School of Medicine, Loma Linda, California, 11234 Anderson St. Loma Linda, CA 92354, USA.
Tel: 909-558-4729; Email: skchoi@students.llu.edu

Abstract

Herpes Zoster Ophthalmicus (HZO) is a potentially sight-threatening condition that involves reactivation of dormant varicella zoster virus on the ophthalmic division of the fifth cranial nerve. Herpes zoster ophthalmicus infrequently involves extraocular muscle palsies which lead to ophthalmoplegia occurring concomitantly with the vesicular rash. We report a case of cranial nerve VI palsy resulting from HZO. An 83 year old male patient presented with diplopia. We observed vesicular lesions on the left hemiface, conjunctival injection and limitation in abduction of the left eye. He was admitted to the hospital and treated with intravenous acyclovir for eight days following the onset of symptoms, but no steroid therapy was initiated. After four weeks, HZO was resolved, and the patient showed minimal to no ophthalmoplegia.

Keywords

Herpes zoster ophthalmicus; varicella zoster; shingles, cranial nerve palsy; diplopia; Abducens nerve palsy; keratitis.

Abbreviations

HZO: Herpes zoster ophthalmicus; HZ: Herpes zoster; VZV: Varicella zoster virus; CN: Cranial nerve.

Introduction

Herpes zoster is a viral infection that is caused by reactivation of varicella-zoster virus (VZV) which has laid dormant in dorsal root ganglia after primary VZV infection (chickenpox) [1]. Symptoms usually start with pain, followed by vesicular skin lesions in a unilateral dermatomal distribution. Herpes Zoster Ophthalmicus (HZO) is one of the complications of herpes zoster that involves the ophthalmic division of the fifth cranial nerve [1]. HZO is usually seen in elderly patients but the condition is usually transient and self-limiting [2]. HZO begins with a prodrome of headache, malaise, and fever followed by unilateral pain or

hypesthesia in the affected eye, forehead, and top of the head [3]. Conjunctivitis, uveitis, episcleritis, keratitis and cranial nerve palsies may occur with the onset of the herpes zoster rash. Cranial nerve III, IV, and VI palsies are rare complications occurring in 7-31% of patients with HZO [3]. Here, we present a case of herpes zoster ophthalmicus with unilateral sixth cranial nerve palsy.

Case Report

An 83 year old male presented to the emergency department with left eye swelling, erythema, pain and vesicular rash that had lasted for four days. He had the vesicular rash with a crusted lesion along his first trigeminal division dermatomal region including his left eyelid and forehead. The patient was diagnosed with shingles and sent home with a seven-day course of valacyclovir tablets. He was compliant with his medication; however, the patient started developing diplopia and worsening left eye swelling the following day which prompted him to visit the emergency department again. The patient endorsed pain on the left upper eyelid, double vision, and limitation of abduction in the left eye. On physical examination, crusty vesicular lesions were noted on the left forehead, eyelid and CN V1 dermatomal region. Hutchinson's sign was observed. He was noted to have erythema and swelling of the left upper eyelid, conjunctival congestion, and horizontal diplopia due to restricted abduction of the left eye (left, right and center gaze; Figure 1, 2, and 3). No corneal involvement was observed. The patient was hemodynamically stable, and both complete blood count and basic metabolic panel were unremarkable. A computed tomographic scan of the orbits showed left periorbital and left frontal scalp soft tissue swelling but was otherwise unremarkable (Figure 4). He was diagnosed with herpes zoster ophthalmicus with CN VI palsy. The patient was subsequently treated with gabapentin and intravenous acyclovir for eight days, but no steroid was given during the hospital course. He did not develop postherpetic neuralgia, and vesicular eruptions resolved within one week with mild residual diplopia. On his fourth week follow-up, the patient showed minimal to no abducens nerve palsy and herpes zoster ophthalmicus resolved without additional treatment. The patient remained asymptomatic in his 6 months follow-up.



Figure 1: Cicatricial lesions on the left hemiface and limited abduction on the left gaze.



Figure 2: Cicatricial lesion on the left hemiface and intact adduction on the right gaze.



Figure 3: Cicatricial lesion on the left hemiface and the center gaze.

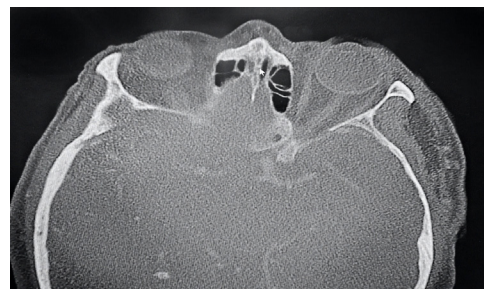


Figure 4: A computed tomographic scan of the orbits showed left periorbital and left frontal scalp soft tissue swelling.

Discussion

Cases of herpes zoster ophthalmicus were first described by Hutchinson and Bowman in 1866 [8]. Today, approximately 33% of the population in the United States develop herpes zoster during their lifetimes. The incidence of herpes zoster and complications such as HZO increase drastically after 50 years of age because of the decline in varicella zoster virus specific cell-mediated immunity. In addition, immunity to herpes zoster can also be suppressed by medications and other medical conditions including cancer and human immunodeficiency virus, and in solid organ transplant recipients [4].

Common clinical manifestations of herpes zoster include dermatomal distribution of vesicular rash and acute neuritis. It is estimated that approximately 10–25% of HZ cases have trigeminal nerve involvement [8]. Most frequently affected nerves are sensory nerves that include supra-orbital nerves and supratrochlear nerves, which are derivations of the ophthalmic branch of the trigeminal nerve [8]. Extraocular motor nerves are less frequently affected, and that leads to extraocular muscle paralysis resulting in ophthalmoplegia as diagnosed in our patient. Among different cranial nerves related to ocular movement, CN III is most commonly involved whereas CN IV is least commonly involved [8]. The onset of extraocular muscle paralysis varies depending on the nerves that are involved; it could occur before, during, and after the skin eruption. The onset of paralysis in cases of abducens nerve paralysis often appears shortly after the cutaneous eruption; this is consistent with our observations of our patient [8]. These motor paralyses can potentially last a few weeks or several months even after the skin lesions are resolved. Other ocular involvement manifests as conjunctivitis, uveitis, episcleritis, and keratitis which typically involves the epithelial, stromal, or endothelial layers of the cornea with high risk for vision loss.

Some literatures report that ophthalmoplegia is the sequela of HZO – a late complication that manifests afterwards within two months of initial herpetic rash [6]. However, a few case reports demonstrate an acute involvement of extraocular muscle with palsies that occur simultaneously with the herpetic rash [7]. The pathogenesis of cranial nerve palsies is controversial, and multiple mechanisms are related to the condition. It is known that reactivation of varicella zoster virus and continuous viral replication provoke intense inflammation of the involved sensory ganglion accompanied by hemorrhagic necrosis of nerve cells. One study states that inflammation of the fifth nerve could invade and paralyze the ocular muscles as the nerve extends across the cavernous sinus and superior orbital fissure [8]. Naumann and Gass have found chronic inflammatory cells that induce an occlusive vasculitis and resultant paresis of ocular muscles [9]. On the other hand, Denny-Brown et al. state that cranial nerve palsies are not directly related to inflammation of any ganglion but involve independent motor neuritis [10]. Moreover, the study by Carroll and Mastalgia claims that a demyelinating process is responsible for ophthalmoplegia in herpes zoster ophthalmicus [11].

Early evaluation and treatment of herpes zoster can reduce the duration and severity of the acute zoster. In the case of ophthalmic zoster, antiviral medication started within 72 hours of the onset of the acute herpes zoster rash can prevent more serious complications such as retinal damage and necrotizing retinopathy that can lead to permanent vision loss [7]. The oral antiviral agents - acyclovir, valacyclovir,

and famciclovir - significantly shorten the duration of acute pain and skin lesions, decrease virus shedding, and reduce the risk of ocular involvement [12]. Corticosteroids can be considered for patients with severe pain, varicella zoster virus induced facial paralysis, or cranial polyneuritis to improve motor outcomes [7]. However, the effectiveness of steroids in combination with antivirals is not well known.

Our patient's herpes zoster ophthalmicus with ophthalmoplegia showed significant improvement with antiviral treatment alone and complete resolution of ophthalmoplegia without steroid administration. Nevertheless, treatment is limited partly due to the poorly defined mechanism of HZO [12]. The prognosis for resolution of ophthalmoplegia following HZO is favorable. Studies of patients with extraocular motor palsy show that they had significant improvement within 2 months, and more than 85% of patients with diplopia had uneventful recovery within 1 year [3].

Source of financial support: Loma Linda Veterans Affairs Hospital. This publication's authors certify that they have no affiliations with or involvement with any organization with any financial interest in the subject matter discussed.

Conflict of interest: The authors of this publication certify that they have no affiliations with or involvement with any organization with any financial interest in the subject matter discussed.

References

1. Gnann JW Jr. Varicella-zoster virus: atypical presentations and unusual complications. *J Infect Dis.* 2002; 186: S91-8.
2. Nibrass C, et al. Herpes zoster ophthalmicus associated with abducens palsy. *Journal of Neurosciences in Rural Practice.* 2014; 5: 180-182.
3. Shin MK, Choi CP, Lee MH. A case of herpes zoster with abducens palsy. *J Korean Med Sci.* 2007; 22: 905-907.
4. Clinical Overview of Herpes Zoster (Shingles). Centers for Disease Control and Prevention, Centers for Disease Control and Prevention. 2020.
5. Athanasiadis L, Konstantinidis A, Papaioannou A, Kyprianou L, Georgiadis N. A case of herpes zoster ophthalmicus associated with multiple ocular and extraocular manifestations. *Neuro-Ophthalmology.* 2008; 32: 75-79.
6. Chang-Godinich A, Lee AG, Brazis PW, Liesegang TJ, Jones DB, Complete ophthalmoplegia after zoster ophthalmicus, *Journal of Neuro-Ophthalmology.* 1997; 17: 262-265.
7. Hakim W, Sherman R, Rezk T, Pannu. An Acute Case of Herpes Zoster Ophthalmicus with Ophthalmoplegia. *Case Reports in Ophthalmological Medicine.* 2012; 1-3.
8. Edgerton AE. Herpes Zoster ophthalmicus: Report of cases and a review of the literature, *Transactions of the American Ophthalmological Society.* 1942; 40: 390-439.
9. Naumann G, Gass M, Font RL. Histopathology of herpes zoster ophthalmicus, *American Journal of Ophthalmology.* 1968; 65; 533-541.
10. Denny-Brown D, Adams RD, Fitzgerald PJ. Pathologic features of herpes zoster: A note on «Genicular herpes». *Arch Neurol Psychiatry.* 1944; 51: 216-231.
11. Carroll WM, Mastaglia FL, Optic neuropathy and ophthalmoplegia in herpes zoster oticus. *Neurology.* 1979; 29: 726-729.
12. Pavan-Langston D. Herpes Zoster. Antivirals and pain management, *Ophthalmology.* 2008; 115: 13-20.

13. Catron T, Hern HG. Herpes zoster ophthalmicus. West J Emerg Med. 2008; 9: 174-176.

Manuscript Information: Received: May 17, 2021; Accepted: July 12, 2021; Published: July 15, 2021

Authors Information: Sang Hee K Choi^{1*}; Yinglin Gao²; James J Huang³

¹Loma Linda University School of Medicine, Loma Linda, California, United States.

²Internal Medicine, Loma Linda Medical Center, Loma Linda, California, United States.

³VA Loma Linda Healthcare System, Loma Linda, California, United States.

Citation: Choi SHK, Gao Y, Huang JJ. A case of herpes zoster ophthalmicus with unilateral sixth cranial (abducens) nerve palsy. Open J Clin Med Case Rep. 2021; 1772.

Copy right statement: Content published in the journal follows Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>). © Choi SHK (2021)

About the Journal: Open Journal of Clinical and Medical Case Reports is an international, open access, peer reviewed Journal focusing exclusively on case reports covering all areas of clinical & medical sciences.

Visit the journal website at www.jclinmedcasereports.com

For reprints and other information, contact info@jclinmedcasereports.com