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## Report of a child with acute herpes zoster ophthalmicus induced partial third nerve palsy

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### ABSTRACT

Herpes zoster is a reactivation of the varicella zoster virus (VZV), which may remain dormant in the dorsal root ganglion of the trigeminal nerve for decades after the patient's initial exposure. The ophthalmic branch of the trigeminal nerve, i.e., the innervation to the ocular structures, is one of the most commonly involved dermatomes, giving rise to herpes zoster ophthalmicus (HZO). A 10-year-old indigenous Malaysian girl presented with a complaint of painful blurring of vision in the right eye for one week. It was followed a few days later by cutaneous vesicular eruptions over the right side of her face and nose and drooping of the right upper lid, associated with double vision. In children, the disease usually follows a mild course, resolving without residual damage. However, this child achieved a best corrected visual acuity of only 6/36 in the affected eye due to corneal scarring. The rashes healed by formation of disfiguring keloids over the right nasal area. This is another rarely reported complication of HZO in immunocompetent individuals.

## 1. Introduction

Herpes zoster is a reactivation of the varicella zoster virus (VZV), which may remain dormant in the dorsal root ganglion of the trigeminal nerve for decades after the patient's initial exposure[1]. The ophthalmic branch of the trigeminal nerve, i.e., the innervation to the ocular structures, is one of the most commonly involved dermatomes, giving rise to herpes zoster ophthalmicus (HZO)[2].

HZO is rare in the paediatric age group, being more common in middle-aged to elderly patients[3–5]. Although its spectrum is wide, third nerve involvement in HZO is unusual as an acute presentation, especially in children[6,7]. We report a rare presentation of acute HZO complicated with keratouveitis and partial third nerve palsy in a young child.

## 2. Case report

A 10-year-old indigenous Malaysian girl presented with a complaint of painful blurring of vision in the right eye for one week. It was followed a few days later by cutaneous vesicular eruptions over the right side of her face and nose and drooping of the right upper lid, associated with double vision.

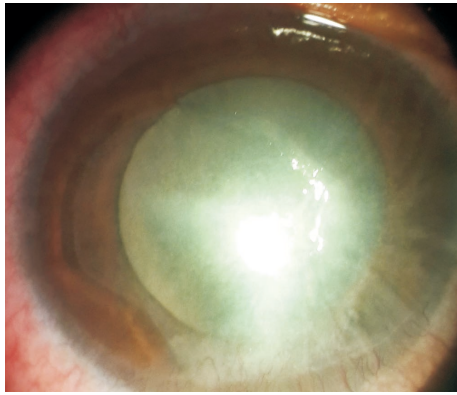
The visual acuity was counting fingers in the right eye and 6/7.5 in the left eye. The best corrected visual acuity remained at counting fingers in the right eye, while in the left, it improved to 6/6. On extraocular movement testing, she had right superior rectus palsy. There was severe ptosis of the right eye, with a mid-dilated (5 mm) and non-reactive pupil (Figure 1). The third nerve palsy with pupil involvement was confirmed by response to pilocarpine 2% but not to dilute pilocarpine (0.125%) (Figure 2). There were oedematous crusting vesicular eruptions over the right upper lid (Figure 3), which extended medially to involve the tip of the nose.

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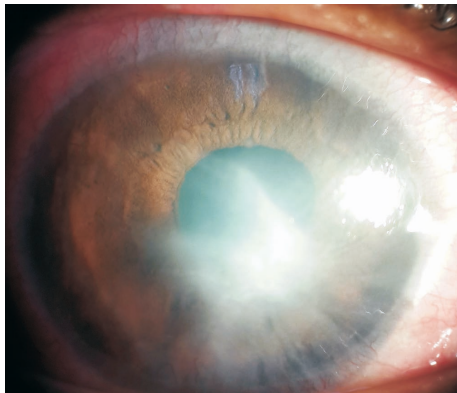
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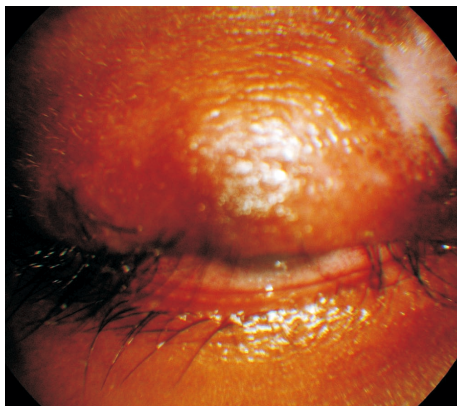
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**Figure 1.** Central corneal ulcer with dilated non-reactive pupil.



**Figure 2.** Healing corneal ulcer with central opacity and small pupil post pilocarpine 2%.



**Figure 3.** Right complete ptosis.

The conjunctiva was injected and chemosed. Corneal sensation in the right eye was absent, and the cornea had a central ulcer measuring 7.6 mm × 7.6 mm in diameter. The anterior chamber had cells and an associated hypopyon. The intraocular pressure was 28 mmHg in the right eye and 10 mmHg in the left eye. The left fundus was normal. There was no view of the right fundus. Ultrasound B-scan of the right eye revealed a flat retina with clear vitreous.

CT-scan and MRI studies of brain and orbit were performed to look for other causes of acute third nerve palsy, but the findings were normal. Infective and connective tissue screen

was likewise negative. In view of the clinical findings, the diagnosis of HZO with partial third nerve palsy, herpetic keratouveitis and raised intraocular pressure was made. The child was started on acyclovir (oral and topical) and topical prednisolone 1%. Preservative-free artificial tears and topical moxifloxacin were also added to prevent secondary complications. The intraocular pressure in the right eye was controlled with topical antiglaucoma medication.

The right eye ptosis slowly improved after 4 weeks. On her last review, three months post-presentation, the diplopia had resolved. She was able to raise the right upper lid 1mm above the superior limbus, but the pupil remained mid-dilated (Figure 4). The right eye visual acuity improved to 6/36, with mild nebulous corneal scarring over the visual axis, and the anterior chamber was quiet. Unfortunately, the vesicular rash over the nose was replaced by a disfiguring keloid (Figure 4). No abnormality was detected in the left eye.



**Figure 4.** Right ptosis partially resolved post treatment. Vesicular rash healed with keloid formation.

### 3. Discussion

Herpes zoster infection is relatively common, with a lifetime risk of 25%, which increases markedly after the age of 50 years, when the incidence is one in two individuals<sup>[8]</sup>. Without antiviral treatment, approximately 50% of patients with herpes zoster develop HZO<sup>[1]</sup>. Diminished cellular immunity is thought to play a role in reactivation of the virus, which is reflected in the increasing incidence and severity of HZO with age<sup>[1]</sup>. HZO is uncommon in children<sup>[1]</sup>, and in this subset of patients, has been especially associated with immune status<sup>[9]</sup>. In our case, HZO presented in a child aged 10 years old, which is rare not only because of her age, but also because of her immunocompetent status.

Common ocular sequelae in HZO include keratitis, iritis, and optic neuritis. This patient not only had herpetic keratouveitis, but also ophthalmoplegia. Ophthalmoplegia occurs due to cranial nerve palsy, which is thought to be due to the spread of inflammation from the trigeminal nerve via the cavernous sinus<sup>[10]</sup>. The incidence of these palsies

as a complication of HZO is approximately 13% in adults, with the oculomotor nerve most commonly involved<sup>[10]</sup>. In children, however, cranial nerve involvement is extremely rare<sup>[11]</sup>. Typically, HZO-related ophthalmoplegia occurs as a late complication, often up to two months after the initial herpetic rash<sup>[12]</sup>. In contrast, ophthalmoplegia manifested in our patient on the second day of presentation. Third nerve palsy with concurrent pupillary paralysis is also an unusual finding in HZO<sup>[13]</sup>. It is postulated to occur due to partial third nerve palsy with selective involvement of the pupillary fibres for light and accommodation–convergence, and relative sparing of the motor fibres<sup>[13]</sup>.

The treatment of HZO consists of oral antiviral agents; 800 mg acyclovir 5 times a day for a week to ten days. In view of the immune-related pathophysiology of HZO, another study has advocated the use of concomitant oral corticosteroids to decrease the viral load<sup>[14]</sup>. We chose not to use the latter, in view of the potential sequelae of steroid use in a child.

The prognosis for complete recovery after an oculomotor palsy following HZO is generally good<sup>[15]</sup>. The duration for complete resolution may range from two weeks to more than a year<sup>[6,7,12]</sup>. In this case, the patient's symptoms improved within 4 weeks of presentation, and there was complete recovery of the function of her right third cranial nerve by three months post presentation.

In children, the disease usually follows a mild course, resolving without residual damage<sup>[6,7]</sup>. However, this child achieved a best corrected visual acuity of only 6/36 in the affected eye due to corneal scarring. The rashes healed by formation of disfiguring keloids over the right nasal area. This is another rarely reported complication of HZO in immunocompetent individuals<sup>[16]</sup>

#### Learning points:

- 1) Acute herpes zoster ophthalmicus may present with a partial third nerve palsy in young children.
- 2) Hutchinson's sign is a sensitive indicator of corneal involvement in herpes zoster ophthalmicus.
- 3) Despite successful treatment of the infection, delayed presentation may result in poor visual outcome due to sequelae of herpes zoster ophthalmicus (e.g. scarring).
- 4) Even in cases where the diagnosis appears to be clinically evident, imaging and blood investigations are necessary in the workup of cranial nerve palsy to rule out possible life-threatening conditions.

#### Conflict of interest statement

We declare that we have no conflict of interest

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