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# A Case of Isolated Adie's Pupil in Herpes Zoster Ophthalmicus

## Case Report

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**Abstract**

We report a case of isolated internal ophthalmoplegia in a 32-year-old female who presented to us 6 weeks after the cutaneous manifestations of Herpes zoster. She presented with diminution of vision and severe photophobia due to right pupil anisocoria that responded to dilute pilocarpine test. She was symptomatically better after the test and was prescribed the same for 2 months, during which there was recovery of cutaneous lesions. In the subsequent visits, her anisocoria had reduced and she was asymptomatic.

Tonic pupil following viral infections can occur due to ciliary ganglion involvement. However in most cases of Adies pupil, it remains idiopathic. Internal ophthalmoplegia in herpes zoster ophthalmicus without any other ocular manifestations is rarely reported.

## Introduction

Adies pupil was first reported by William John Adie in the year 1931 as a case of tonic pupil. It is usually seen in young female of 20-40 years of age, unilateral in 80% of cases. It presents with difference in size of pupil, noted by the patient or with usual complaints of photophobia, difficulty in near work or blurring of vision. The common signs remain absence of light reflex, better constriction to accommodation, vermiform movements of the pupillary border, and hypersensitivity to 0.125% pilocarpine. It is actually reported to occur following infections, tumours, autoimmune diseases, and trauma though it can also be associated with systemic diseases with autonomic dysfunction. The site of insult in majority is damage to the ciliary ganglion and its parasympathetic postganglionic fibres. Hepatitis, Neurosyphilis, COVID-19, Leprosy, herpes zoster are few of the associated aetiologies of Adie's pupil [1, 2]. Though Herpes remains a common virus affecting the eye, tonic pupil in relation to this has been less commonly described. In this case Adies tonic pupil remains the isolated ocular finding in a young female with herpes zoster [3].

## Case Report

A 32 year old female presented to us with the complaints of worsening of vision in the right eye (RE) associated with photophobia since 1 week. She had a history of excruciating pain followed by skin rash around the eye and on the right side of the forehead extending till tip of nosesince 5 weeks consistent with the diagnosis of herpes zoster ophthalmicus (HZO). (Figure 1) She was started on oral Acyclovir (800 mg, five times a day) within 24 hours of skin rash onset and maintained for 1 week, with improvement of her symptoms. She denied any other history of trauma, surgery or inflammatory disease. On examination her visual acuity was 6/18, N10 in the RE and 6/6 , N6 in the left eye. Pupil size in the RE was 8 mm compared to 3 mm in the left eye (LE). (Figure 2) Though she was very symptomatic for

**Figure 1:** Healing lesions over forehead and cheek.

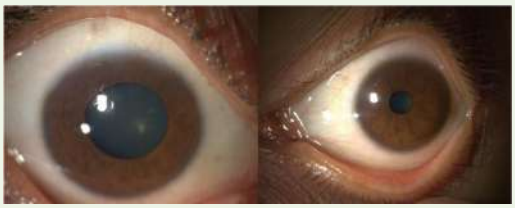

**Figure 2:** Right eye showing 4mm anisocoria (before dilute pilocarpine test)

a detailed examination, consensual reflexes appeared intact in both eyes. Extraocular motility and fundus examination was normal in both eyes. In the examination of near reflex, the size of the left pupil reduced slowly but not completely. Accommodation amplitudes could not be done as patient refrained due to symptoms, however she had difficulty in reading, possibly due to photophobia. Corneal sensations were poor and rest anterior segment examination detected no abnormality in right eye. Vermiform movements could not be appreciated. The extraocular motility appeared full, with mild limitation of depression, though patient was not very co-operative. (Figure 3)

A dilute pilocarpine test was done with 0.125% pilocarpine which was positive showing constriction of pupil to 2 mm, improvement in RE visual acuity to 6/6P, N6 and relief from photophobia.(Figure4). Laboratory blood tests and magnetic resonance imaging of brain and orbit did not reveal any abnormality.

Adiagnosis of Adie's pupil in HZO was made and dilute pilocarpine was prescribed for 1 month.On her subsequent follow up she reported to be symptomatically better and the anisocoria had reduced to 4 mm from 8 mm in the right eye.Extraocular motility appeared full and free 2 months post treatment and she remained orthophoric. (Figure 5). Posterior segment was normal in both eyes throughout the course.

## Discussion

Herpes Zoster Ophthalmicus (HZO), is a viral disease in older adults, which occurs after reactivation of latent varicella-zoster virus (VZV) present within the sensory spinal or cerebral ganglia. It is characterized by a unilateral painful skin rash in one or more dermatome distributions of the fifth cranial nerve (trigeminal nerve), shared by the eye and ocular adnexa. Painful erythematous skin lesions with macules, papules, vesicles, pustules, and crusting lesions

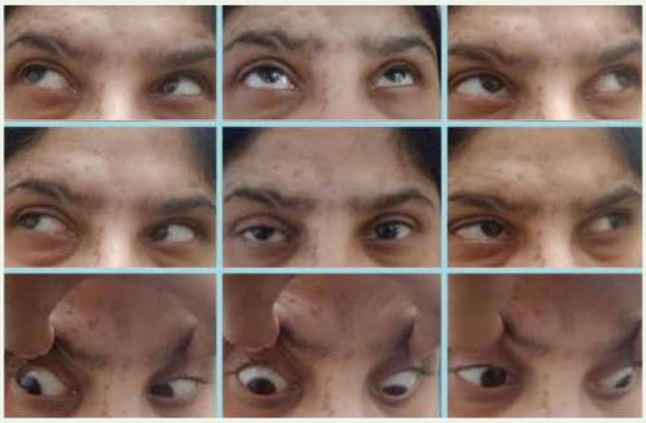

**Figure 3:** Extraocular motility showing RE depression limitation at presentation

**Figure 4:** Improvement in anisocoria (after dilute 0.125% pilocarpine test).

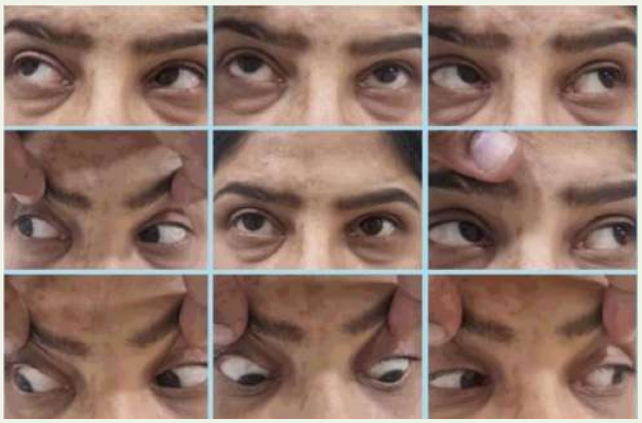

**Figure 5:** Nine gaze picture showing extra ocular motility.

in the dermatome distribution and associated ocular findings strongly suggest HZO [3].

Vesicular skin rash and scars in the forehead lids and lid adnexa, conjunctivitis, episcleritis and scleritis, keratitis, decreased corneal sensation, iridocyclitis, secondary glaucoma, retinal involvement, multiple ocular nerve involvement are the various manifestations of HZO [3].

Holmes Adie's pupil is a type of pupil with parasympathetic denervation in which the affected pupil is large, poorly reacting to light, but reacting better to accommodation.


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Although most cases are idiopathic it mainly results from inflammation or damage to the ciliary ganglion, and characterized by a large regular pupil with decreased response to light but preserved or enhanced constriction to accommodation, segmental iris constriction, vermiform movements of the pupillary border, and hypersensitivity to 0.125% pilocarpine [1,4].

Adie's pupil in isolation has been reported rarely following HZO. It definitely warrants careful evaluation as it may not be noticed in the presence of the symptomatic skin lesions, which tend to be more bothersome. A similar case of Holmes Adie's pupil has been reported in 2016 in a 35-year-old male which presented 3 months after the onset of herpetic rash and was treated with dilute pilocarpine [5].

Karti et al has reported a case of isolated internal ophthalmoplegia in a 27 year old female which did not respond to dilute pilocarpine unlike in our case. However, they have reported positive constriction to 2% pilocarpine, but the mydriasis persisted even at 4 months follow up [6].

Pion and Salu have described a case of complete ophthalmoplegia with Adie's pupil in herpes zoster where the mechanism of cholinergic hypersensitivity was considered a part of third nerve palsy [7].

The most common cause of Adie's tonic pupil is infectious diseases, most commonly Syphilis followed by immune related disorders and paraneoplastic syndromes. In majority of the cases, the primary cause should be evaluated and ophthalmic symptoms improve after treatment of the primary cause [1]. However symptoms like blurring of vision and photophobia is usually treated with dilute pilocarpine.

In our case also the denervation hypersensitivity had set in at the time of presentation and there was positive response to dilute pilocarpine. In these cases the cholinergic super-sensitivity is explained by the postganglionic parasympathetic denervation, which leads to an up-regulation of the receptors at the nerve - sphincter synapse. Adie's tonic pupil is caused by acute denervation of the ciliary body and iris sphincter.

Although total ophthalmoplegia has been reported in few cases in association with herpes zoster, isolated internal ophthalmoplegia has not been commonly reported.

## Conclusion

Isolated anisocoria can be a presenting manifestation of herpes zoster. In the presence of painful skin lesions, although a complete ocular evaluation may be more demanding, yet it has to be done carefully. Partial or complete , external or internal ophthalmoplegia or both can be associated besides the corneal lesions. Anisocoria with difficulty in reading and photophobia accelerates the discomfort, thus needs prompt management.

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