



MYSTERIOUS BLUE EYE: CASE OF ACUTE HYDROPS DUE TO LONG-TERM STEROID USE IN VERNAL KERATOCONJUNCTIVITIS

Ophthalmology

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ABSTRACT

Background: Vernal keratoconjunctivitis (VKC) is a chronic, recurrent allergic ocular disorder predominantly affecting children. Prolonged and indiscriminate use of topical corticosteroids in VKC can lead to serious sight-threatening complications, including steroid-induced glaucoma and acute corneal hydrops. **Objective:** To report a rare case of acute corneal hydrops secondary to long-term topical steroid use in a child with vernal keratoconjunctivitis and highlight the importance of timely diagnosis and appropriate management. **Methods:** An 8-year-old male presented with sudden diminution of vision, ocular pain, and bluish discoloration of the left eye for 15 days. He had a history of vernal keratoconjunctivitis and was on topical corticosteroids for six months. Visual acuity in the left eye was hand movements. Slit-lamp examination revealed conjunctival congestion, giant papillae, corneal edema with epithelial bullae, and raised intraocular pressure. B-scan ultrasonography showed a normal posterior segment. The right eye showed conjunctival congestion, giant papillae, and early posterior polar cataract. **Results:** Topical steroids were immediately discontinued and replaced with immunosuppressive agents and antiallergic medications, along with antiglaucoma drugs and cycloplegics. At one-month follow-up, there was resolution of corneal edema with residual stromal scarring and improvement in visual acuity. **Conclusion:** This case highlights the potential for severe steroid-related ocular complications in vernal keratoconjunctivitis. Judicious use of topical corticosteroids, regular monitoring of intraocular pressure, and early intervention are essential to prevent irreversible vision loss due to corneal scarring and optic nerve damage.

KEYWORDS

Vernal Keratoconjunctivitis, Acute Corneal Hydrops, Steroid-induced Glaucoma, Pediatric Ocular Allergy, Corneal Edema.

INTRODUCTION

Vernal keratoconjunctivitis (VKC) is a chronic, bilateral, recurrent allergic inflammatory disorder of the ocular surface, predominantly affecting children and young adolescents, particularly in warm and dry climates. It is characterized by intense itching, photophobia, mucous discharge, and the presence of giant papillae on the tarsal conjunctiva or limbal hypertrophy. Although VKC is usually a self-limiting disease, its chronic course and recurrent exacerbations often necessitate prolonged medical therapy.

Topical corticosteroids are frequently used in moderate to severe cases to control inflammation and provide symptomatic relief. However, indiscriminate and unsupervised long-term use of topical steroids can lead to serious ocular complications, including steroid-induced glaucoma, cataract formation, and secondary corneal changes. Acute corneal hydrops is a rare but sight-threatening complication in VKC, resulting from a sudden break in Descemet's membrane, leading to stromal edema and severe visual impairment.

Early recognition of steroid-related complications and timely intervention are crucial to prevent irreversible visual loss. This case report highlights a rare presentation of acute corneal hydrops in a child with vernal keratoconjunctivitis secondary to prolonged topical steroid use and emphasizes the importance of judicious steroid therapy and regular follow-up in paediatric ocular allergy.

MATERIALS AND METHODS

Study Design: Case Report.

Study Setting: Department of Ophthalmology, Rio, Minto Ophthalmic Hospital, Bangalore, a tertiary care centre.

Case Presentation

An 8-year-old male child presented to the ophthalmology outpatient department with complaints of sudden diminution of vision, pain, photophobia, and bluish discoloration of the left eye for 15 days. The child was a known case of vernal keratoconjunctivitis and had been using topical corticosteroid eye drops intermittently for the past six months without regular follow-up. There was no history of trauma or contact lens use.

On examination, visual acuity in the right eye was 6/12, while the left eye had vision of hand movements close to face. Slit-lamp examination of the right eye revealed conjunctival congestion with giant papillae and an early posterior subcapsular cataract. The left eye showed marked conjunctival congestion with giant papillae, diffuse corneal stromal edema with epithelial bullae, and a bluish hue

suggestive of acute corneal hydrops. The anterior chamber was deep and quiet. Intraocular pressure in the left eye was raised.

Posterior segment evaluation of the left eye was not possible due to corneal edema; however, B-scan ultrasonography revealed a normal posterior segment. A diagnosis of acute corneal hydrops with steroid-induced glaucoma secondary to long-term topical steroid use in VKC was made.

Topical steroids were immediately discontinued. The patient was started on topical immunomodulators, antiallergic medications, cycloplegics, hypertonic saline, lubricants, and antiglaucoma medications. On follow-up at one month, there was significant resolution of corneal edema with residual stromal scarring and improvement in visual acuity compared to the initial presentation.

Table 1: Clinical Profile of the Patient

Parameter	Findings
Age	8 years
Gender	Male
Presenting complaints	Sudden diminution of vision, pain, photophobia, bluish discoloration
Duration of symptoms	15 days
History of VKC	Present
Steroid usage	Topical steroids for 6 months
History of trauma	Absent

Table 2: Ocular Examination

	OD	OS
VISUAL ACUITY	6/6	HM+ve
HEAD POSTURE	NORMAL	
LID AND ADNEXA	NORMAL	NORMAL
CONJUNCTIVA	CONGESTION with GIANT PAPILLAE	CONGESTION with GIANT PAPILLAE
CORNEA	CLEAR	EDEMATOUS with SEVERE EPITHELIAL BULLAE
ANTERIOR CHAMBER	NORMAL DEPTH	SHALLOW
PUPIL	3mmRRR	DETAILS NOT MADE OUT
LENS	EARLY POSTERIOR POLAR CATARACT	DETAILS NOT MADE OUT
IOP	9mmHg	39mmHg
B-SCAN	NORMAL	NORMAL

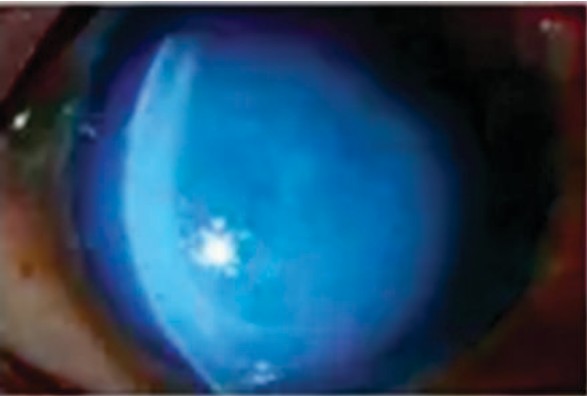


Figure 1: Slit-lamp Photograph of the Left Eye Showing Acute Corneal Hydrops with Marked Corneal Edema and Bluish Discoloration in a Child With Vernal Keratoconjunctivitis.

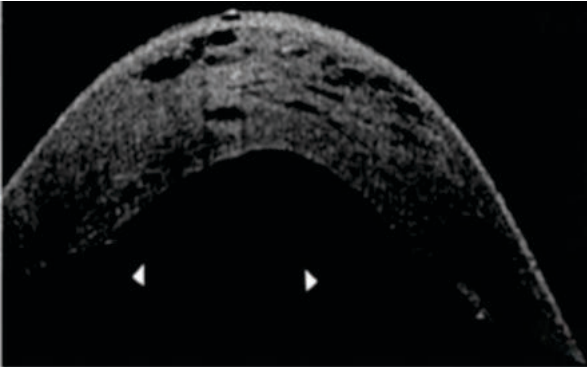


Figure 2: Anterior Segment Optical Coherence Tomography (AS-OCT) of the Left Eye Showing Marked Corneal Stromal Edema with Epithelial Bullae, Consistent with Acute Corneal Hydrops.

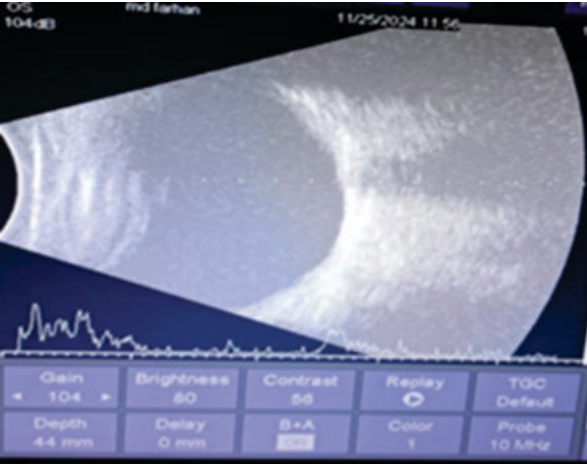


Figure 3: B-scan Ultrasonography of the Left Eye Showing an Attached Retina with Normal Vitreoretinal Interface and no Evidence of Posterior Segment Pathology.

Management

Immediate cessation of topical corticosteroids was advised in view of steroid-induced complications. The patient was started on immunomodulatory therapy along with antiallergic medications, cycloplegics, and hypertonic saline to control inflammation, relieve symptoms, and reduce corneal edema. Elevated intraocular pressure was managed with topical antiglaucoma medications. On follow-up at one month, there was significant resolution of corneal edema with residual stromal scarring. The patient showed appreciable improvement in visual acuity, indicating a favourable clinical response to timely medical management.

Table 3: Management and Outcome

Aspect	Details
Immediate intervention	Discontinuation of steroids

Medical treatment	Immunomodulators, antiallergics, cycloplegics, hypertonic saline
IOP control	Topical antiglaucoma drugs
Follow-up	1 month
Outcome	Resolution of corneal edema with stromal scarring
Visual improvement	Yes

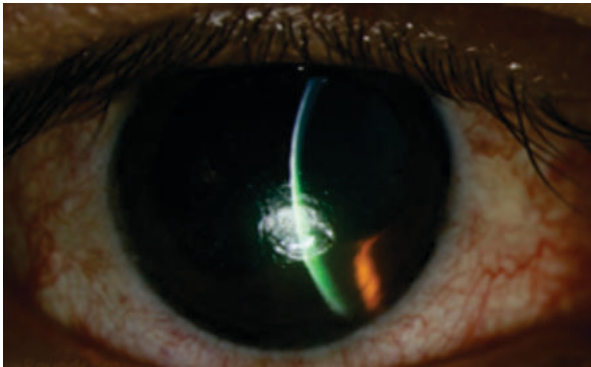


Figure 4: Slit-lamp Image Demonstrating Resolution Phase of Acute Corneal Hydrops. The Vertical Slit Beam Highlights Corneal Edema Reduction, With Partial Clearing of Stromal Haze and Re-establishment of Corneal Transparency.



Figure 5: Resolved Acute Hydrops.

DISCUSSION

Vernal keratoconjunctivitis is a chronic allergic disorder mediated by IgE and T-cell–driven inflammation, commonly affecting young males in warm climates.[1] Severe itching often leads to eye rubbing, which can predispose patients to corneal complications. Although acute corneal hydrops is classically associated with keratoconus, it can rarely occur in VKC due to chronic mechanical trauma, inflammatory damage, and weakening of corneal structures.[1,2]

Topical corticosteroids, while effective in controlling acute inflammation, are associated with well-documented adverse effects, including steroid-induced ocular hypertension and glaucoma, especially in children who are known steroid responders.[3] Prolonged steroid use can also delay corneal healing and mask disease progression. In the present case, unsupervised long-term steroid use likely contributed to elevated intraocular pressure and corneal structural compromise, culminating in acute hydrops.[3,4]

Management of acute corneal hydrops is primarily conservative and includes cessation of steroids, control of intraocular pressure, cycloplegics, hypertonic saline, and anti-inflammatory agents. The use of immunomodulators such as topical cyclosporine or tacrolimus plays a crucial role in long-term disease control and prevention of steroid-related complications.[5] Early diagnosis and prompt management are essential to limit stromal scarring and optimize visual outcomes.[5] In this patient, conservative therapy led to gradual resolution of corneal edema and scarring, with documented improvement in best-corrected visual acuity to 6/18, highlighting the potential for functional recovery even after severe complications.

CONCLUSION

This case highlights a rare but serious complication of vernal keratoconjunctivitis resulting from indiscriminate long-term topical steroid use. Acute corneal hydrops and steroid-induced glaucoma can lead to significant visual morbidity if not recognized early. Judicious

use of topical steroids, preference for steroid-sparing immunomodulatory therapy, and regular follow-up are essential in managing paediatric VKC. Increased awareness among clinicians and caregivers is crucial to prevent avoidable vision-threatening complications. Importantly, with timely intervention and careful monitoring, meaningful visual rehabilitation is achievable—as demonstrated by the improvement of vision to 6/18 in the present case.

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