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Acetazolamide in the treatment of X-linked retinoschisis maculopathy.

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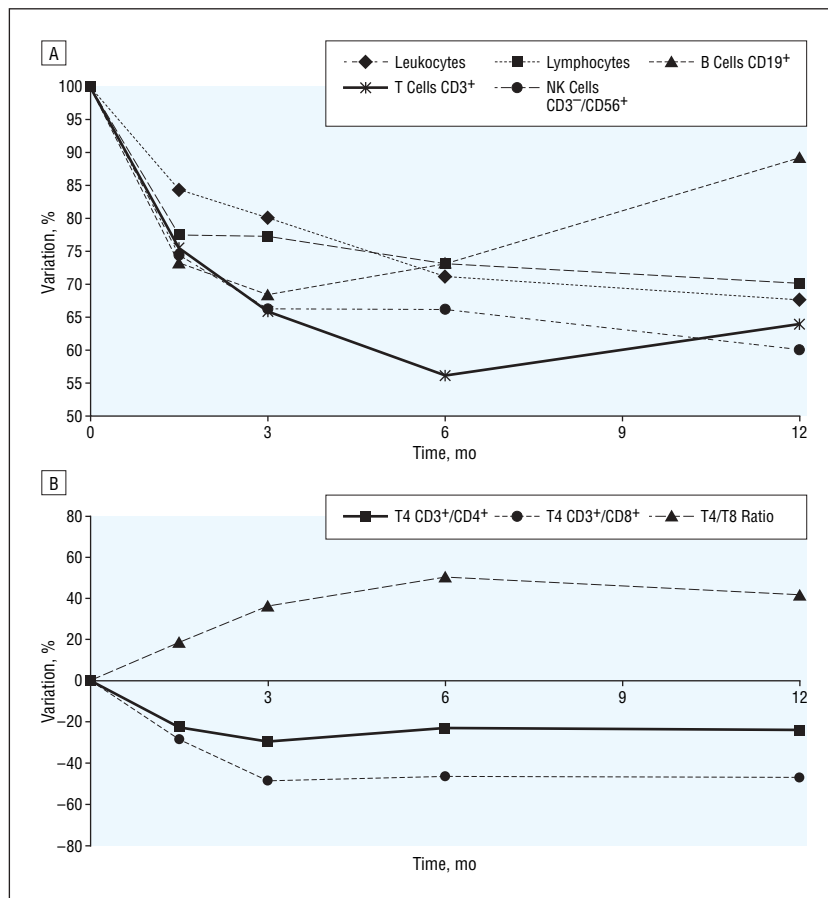


Figure 2. Individual changes in percentage of variation of patient 2 in peripheral blood white cells and the subpopulations (A) and in T cells and the CD4/CD8 ratio (B). NK indicates natural killer; T4, T helper lymphocytes; T8, T suppressor cells.

all 4 patients. The immunosuppressive effect of FAEs on the white blood cells seen in our patients was similar to those in psoriasis patients.⁵

In intermediate uveitis, an increased number of peripheral blood T cells was found. It has been shown that FAEs can modulate the immune response by a predominant reduction of CD8⁺ T lymphocytes⁵ and a shift of the T cell response to a T helper 2 subtype.⁶ In experimental autoimmune uveoretinitis, it has been shown that suppression of T helper 1 response successfully reduced the degree of inflammation. These preliminary data suggest that improvement of uveitis was associated with reduced T cell subsets.

One major problem with FAEs seems to be the adverse effects, mainly gastrointestinal disturbance (1 patient) and dermal flushing (all patients).⁴ No serious ad-

verse effects, especially opportunistic infections, occurred. However, as no carcinogenic effect of FAEs is yet known, it may also be used in patients with malignancies or unspecified tumors.

This pilot study offers a promising perspective on FAEs, a new therapeutic agent treating selected patients with noninfectious uveitis with a chronic clinical course. Further prospective case-control investigations with larger study populations are required to define the role of FAEs in the treatment of uveitis in more detail.

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Acetazolamide in the Treatment of X-Linked Retinoschisis Maculopathy

Macular schisis cavities observed in patients with X-linked retinoschisis are not associated with leakage on fluorescein angiogram as seen in other forms of cystoid macular edema. We report a case in which a young patient with this condition showed a reproducible clinical response to oral acetazolamide therapy with normalization of both macular anatomy and visual acuity.

Report of a Case. An 8-year-old boy was evaluated for reduced central vision. At age 4 years, pigmentary changes were noted in his left fundus, and he had been treated for amblyopia with hyperopic correction and patching. Best-corrected visual acuities in each eye had varied between 20/60 and 20/30.

He had no other significant medical history and received no medications, and the family ophthalmic history was positive only for amblyopia in a great-uncle. Snellen visual acuities were OU 20/70 with equally reactive pupils. Dilated examination

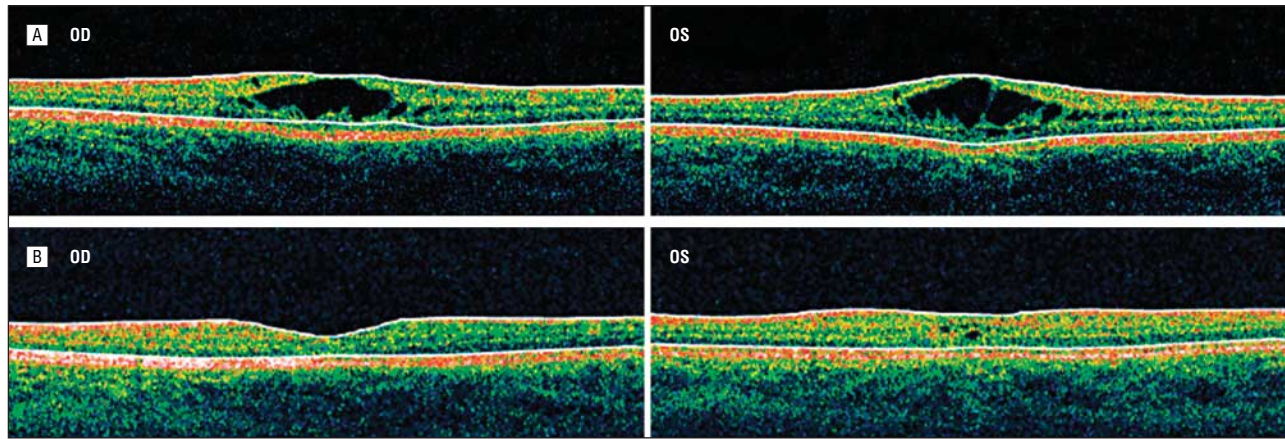


Figure 1. Optical coherence tomography images at the time of institution and follow-up from initial treatment. A, Image at initial visit demonstrating schisis within the central macula. Corrected visual acuities were 20/70 OU. B, Image after 9 months of treatment shows near complete resolution of central schisis OU. Corrected visual acuities were 20/40 + 1 OD, 20/40 + 2 OS.

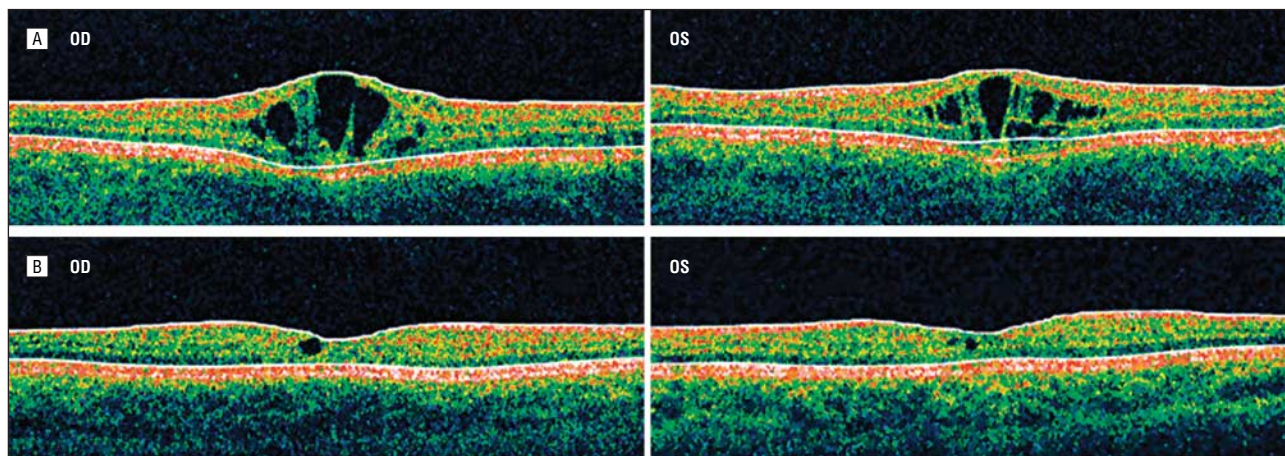


Figure 2. Optical coherence tomography (OCT) images after discontinuation and reinstatement of therapy. A, Image from OCT done 2.5 months after stopping acetazolamide with recurrence of schisis cavities in both eyes. Corrected visual acuities were 20/40–2 OD, 20/50 + 2 OS. B, Image showing recovery of macular anatomy 3 months after reinstatement of acetazolamide. Corrected visual acuities were 20/25–2 OD, 20/30–1 OS.

showed granular midperipheral retinal pigment epithelium changes, central macular schisis, and normal optic nerves and retinal vasculature. Full-field electroretinogram revealed markedly reduced rod responses and decreased cone responses; both a-waves and b-waves were found to be reduced. Optical coherence tomography confirmed central macular schisis (**Figure 1A**). A diagnosis of X-linked retinoschisis vs X-linked retinitis pigmentosa was made. A trial of acetazolamide at 62.5 mg 3 times a day was initiated for presumed cystoid macular edema secondary to a retinal dystrophy.

Two months later, visual acuities had improved slightly to 20/60 OU. Optical coherence tomography demonstrated unchanged macular edema in the right eye but

marked improvement in the left eye. Acetazolamide was increased to 250 mg daily. Over the next 9 months, his visual acuities stabilized to the 20/40+ range OU and there was nearly complete resolution of the cystoid spaces on optical coherence tomography (**Figure 1B**).

Subsequently, the patient was seen elsewhere: his best-corrected visual acuities were 20/20 OU, there were full V-4e and I-4e perimetric fields in the right eye and a small superior restriction in the left eye, and an electroretinogram showed normal cone responses with borderline rod b-wave and mixed b-wave amplitudes (left eye tested only). Molecular studies (National Eye Institute DNA Diagnostic Laboratory) established the presence of a previously reported mutation in exon 4 of the *XLR51* gene

(Arg102Gln).^{1,2} Subsequent genetic testing in the patient's mother found the heterozygous state of the same mutation. The acetazolamide was discontinued.

After 2.5 months, the patient returned with a decrease in visual acuity, and optical coherence tomography demonstrated recurrence of central macular schisis in both eyes (**Figure 2A**). Acetazolamide was restarted. Three months later, there was a significant decrease in the size and number of schisis cavities (**Figure 2B**).

Comment. Here we report the reduction of foveal schisis with acetazolamide in a young patient with molecularly proven X-linked retinoschisis. Although acetazolamide is frequently used in the treatment of macular edema associated with

retinitis pigmentosa, we are unaware of any previous reports on the use of this medication in treating X-linked retinoschisis. Moderate improvement in visual acuity was observed; however, optical coherence tomography demonstrated clear improvement in the foveal schisis. A causal relationship between the medication and the retinal status is strongly suggested by the recurrence of retinal schisis within 2 months after medication cessation and a recovery of retinal morphology when the medication was reinstated.

Acetazolamide may reduce macular edema by altering fluid transport across the retinal pigment epithelium, causing a reduction of the fluid contained within the macular schisis cavities even in the absence of fluorescein angiographic leakage.³ The utility of acetazolamide may be limited to young patients and those with mild central schisis. Given the dramatic results observed in this patient, a treatment trial of acetazolamide with additional patients seems warranted with the goals of preserving both retinal integrity and visual function.

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Additional Information: Subsequent to the submission and acceptance of this case report for publication, Drs Apushkin and Fishman published a series of 8 patients with X-linked retinoschisis who showed a clinical response to topical dorzolamide therapy with follow-up ranging from 1 month (2 subjects) to 6 months (1 subject) (*Retina*. 2007;26:741-745).

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Gigantic Waves in the Tear Film Generated by Bubbles From a Large Glaucoma Bleb

To maintain clear vision, the tear film needs to be stable between blinks. The tear film stability depends on a delicate balance between the production, spread, and clearance of tear fluids. However, little is known about whether abnormal spread of tear fluids over the cornea is sufficient to cause visual disturbance. Herein we report a case of a large, cystic glaucoma bleb in which the patient complained not only of dysesthesia,^{1,2} but also of fluctuating blurry vision.

Report of a Case. A 75-year-old woman with a history of primary open glaucoma received trabeculectomy and cataract surgeries in both eyes in 2000. After the surgeries, she complained of dry eye, sharp pain, and fluctuating blurry vision in both eyes.

In May 2004, both eyes received surgical correction of conjunctivochalasis. After the surgeries, the pain and dryness were relieved in both eyes. Nevertheless, she still complained of fluctuating blurry vision in the left eye.

Further examination revealed that a cystic bleb present on the superior bulbar conjunctiva was bulging and hanging over the cornea more in the left eye than in the right eye (**Figure 1A** and B). We used a dental mirror to determine the elevation of the eyelid by the over-size bleb and to reveal that the upper eyelid was overriding the lower eyelid to a greater extent in the left eye (Figure 1C and D). After a complete blink, air bubbles were released from the upper eyelid margin of the left eye. The blurry vision fluctuated and could not be improved with refraction. The tear film was analyzed with sequential images taken by a Tearscope Plus (Keeler, Windsor, England), which showed an air bubble (**Figure 2**) that subsequently burst to create a

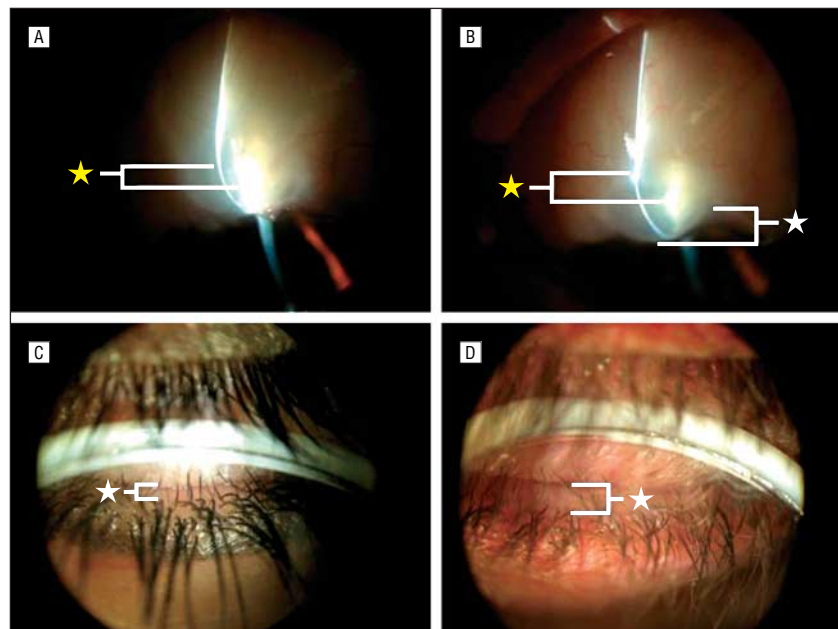


Figure 1. External photographs showing the height (marked by a yellow star) of a cystic bleb in the right eye (A). Such a bleb height was greater in the left eye, where the bleb was also hanging further over the cornea (B, marked by a white star). The photograph taken via a dental mirror revealed a normal distance between the last eyelash and the contact of the lower eyelid skin, ie, the overriding distance (white star) in a normal subject (C). This overriding distance was greater in the patient's left eye (D).