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10.4103/ojo.ojo_108_21

Anterior segment optical coherence tomography features of netarsudil-associated reticular corneal edema

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Description to Accompany Images

A 39-year-old male presented for the evaluation of decreased vision and discomfort of the right eye. The patient had an ocular history notable for primary open-angle glaucoma. Surgical history included cataract extraction with intraocular lens implantation at age 14. Two years before presentation, lens dislocation was noted, and the patient underwent a scleral sutured intraocular lens with a pars plana vitrectomy and pars plana Ahmed glaucoma valve placement. At the time of presentation, the patient was using topical dorzolamide-timolol 22.3/6.8 mg/mL twice daily, brimonidine 0.2% twice daily, latanoprost 0.005% once daily, and netarsudil 0.02% once daily.

Clinical evaluation revealed counting fingers vision at four feet in the right eye. Intraocular pressure was 22 mmHg and central corneal thickness (CCT) as measured by pachymetry was 768 μ m. Slit-lamp examination was notable for diffuse limbus to limbus bullous reticular epithelial edema [Figure 1]. Anterior segment optical coherence tomography (AS-OCT) was obtained showing the unique pattern of localized bullous epithelial edema [Figure 2].

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Differential diagnosis included intraocular pressure-related edema, corneal edema due to corneal endothelial loss after multiple intraocular surgeries, and netarsudil-associated corneal edema. Netarsudil was discontinued with close monitoring of intraocular pressure, and the patient underwent cyclophotocoagulation for intraocular pressure reduction. After 4 months from initial evaluation, best-corrected visual acuity improved to 20/70 in the right eye with an intraocular pressure of 12 mmHg. CCT decreased to 598 μ m. Examination demonstrated the resolution of the reticular epithelial edema [Figure 3], although trace stromal edema was noted. AS-OCT confirmed the absence of reticular epithelial edema [Figure 4].

Rho kinase (ROCK) inhibitors have gained popularity in ophthalmology, especially given their role in intraocular pressure reduction. Netarsudil 0.02% is a topical ROCK inhibitor marketed as Rhopressa (Aerie Pharmaceuticals, Bedminster, NJ) and was approved by the Food and Drug Administration in 2017 as a once daily drop for the reduction of intraocular pressure.^[1] Ocular adverse events occur in 73% of patients, and the most commonly reported local side effects include conjunctival hyperemia (50%), subconjunctival hemorrhage (15%), and nonvisually significant cornea verticillata (9%).^[2]

How to cite this article: Khalili A, Razeghinejad R, Syed ZA. Anterior segment optical coherence tomography features of netarsudil-associated reticular corneal edema. *Oman J Ophthalmol* 2022;15:115-6.

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Submitted: 05-Apr-2021

Revised: 05-Jun-2021

Accepted: 29-May-2021

Published: 02-Mar-2022



Figure 1: Slit-lamp photo of the right eye on presentation demonstrating limbus to limbus bullous reticular epithelial edema

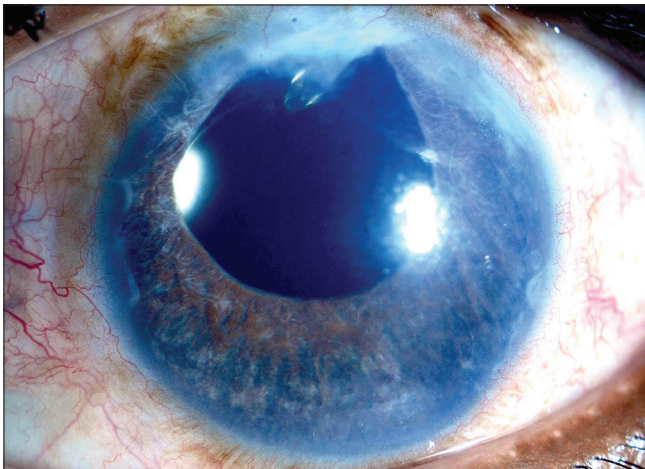


Figure 3: Slit-lamp photo illustrating improvement of corneal edema after discontinuation of netarsudil

A unique side effect of netarsudil 0.02% is bullous reticular epithelial edema, especially in patients with previous corneal stromal edema.^[3] Similar to previous reports, this patient had mild stromal edema; this was noted on clinical examination and evident from a mildly thickened pachymetry at follow-up. ROCK inhibitors optimize endothelial cell proliferation and adhesion.^[4] This unique presentation of edema has an unclear mechanism, with hypotheses including a potential shift of stromal edema to the cornea epithelium due to improved endothelial function with clearing of the stroma posteriorly, as well as direct effects on corneal epithelial intercellular junctions.^[3]

This case illustrates the use of AS-OCT in the evaluation of the reticular pattern of bullous epithelial corneal edema. After proper identification, this condition can be

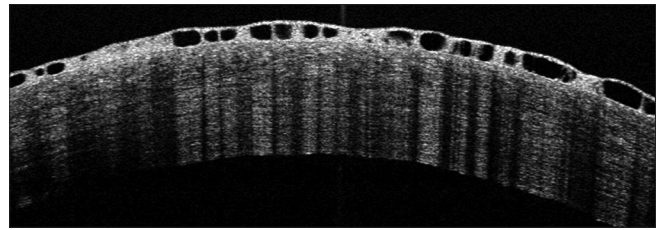


Figure 2: Prominent bullous epithelial edema as visualized with anterior segment optical coherence tomography

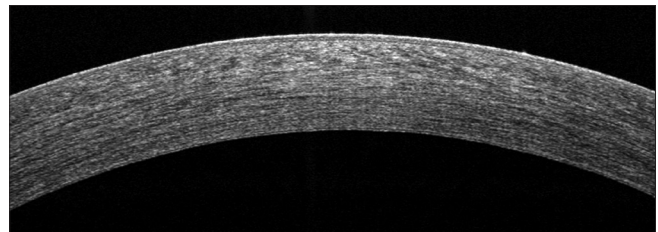


Figure 4: Anterior segment optical coherence tomography demonstrating resolution of the epithelial bullae after discontinuation of netarsudil

properly addressed with discontinuation of the topical medication to allow for improvement without need for surgical intervention.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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