

Epithelial mapping and topical antiglaucoma treatment: Early detector of ocular surface suffering?

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Letter to Editor

At first, it might seem superfluous, what association can exist between lowering intraocular pressure and epithelial thickness? and if a relationship really exists, what is its importance and its therapeutic implication? The answer to this question is a yes. a relationship really does exist. The answer to the second question requires further reflection.

The corneal epithelium is one of the major structures that undergo changes to the ocular surface. It is for this reason that the central epithelial thickness measurement has been proposed as an objective indicator to monitor the health of the ocular surface [1]. Several recent studies have been interested in measuring the central thickness of the corneal epithelium in glaucomatous subjects under topical treatment. all these studies have sought to determine the effect of local treatments on this protective layer.

We report the case of a 60-year-old patient who has bilateral open-angle glaucoma under dual therapy (beta blocker and prostaglandin). Prostaglandin eye drops are preservative-free. Beta-blocker eye drops are with preservative. The patient is not taking tear substitutes. The patient consults for a check-up of his glaucoma and accuses episodes of conjunctival hyperemia and epiphora.

The best corrected visual acuity was 9/10 th in OR and 7/10 in OS. IOP was at 13 mmhg in ODG. Tear film analysis found a reduced tear river <1mm (**Figure 1**), reduced BUT <5 seconds. The tear film is unstable, we have objectified a bilateral diffuse superficial punctate keratitis (**Figure 2**). The patient had pterygium and conjunctival staining (**Figure 3**). Examination of the anterior segment was unremarkable. Examination of the posterior segment found an excavation at 4/10 in OR and 5/10 in OS. The examination of the macular and papillary OCT (RNFL and CCG) as well as the visual field 24.2 showed a stable evolution of this open angle glaucoma.

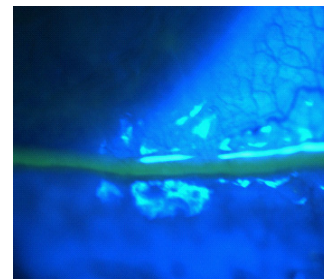


Figure 1: Evaluation of the tear river which seems reduced.

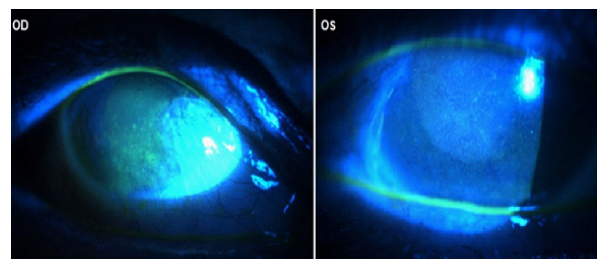


Figure 2: Bilateral corneal staining and bilateral pterygium before treatment.

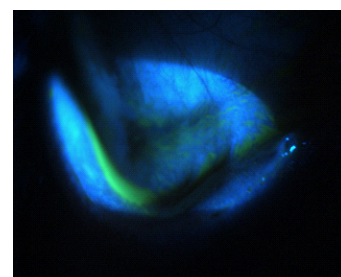


Figure 3: Conjunctival staining before treatment.

We prescribed lacrimal substitutes (hyaluronic acid and trhealose), ointment based on vitamin A and eyelid hygiene. The evolution was marked by the healing of the epithelium and by the improvement in the quality of the tear film. A distant epithelial mapping was carried out and objectified a moderate and diffuse bilateral central epithelial thinning (49 m in OD and 47 m in OG) (**Figure 4**). Pachymetry showed no significant change in central corneal thickness.

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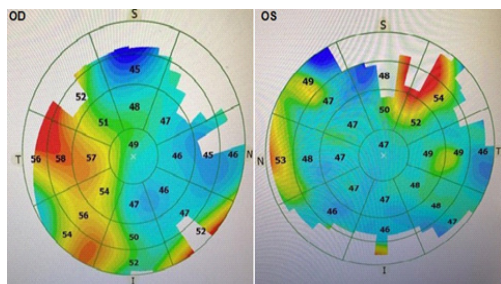


Figure 4: Measurement of the CET which shows a moderate central thinning with bilateral nasal thickening related to the pterygium.

Assessment of ocular surface using epithelial thickness mapping is non-invasive and repeatable technique. It's also an objective method. Thickness variability can be correlated with patient's dry eye symptoms, and that epithelial thickness profiles could be used to monitor a patient's response to treatment [2]. Given the ocular surface alteration of glaucoma patients, several studies investigated the effects of treatment on corneal epithelium with OCT mapping.

The thinning is usually moderate. There is greater epithelial thickness variability and a thinner epithelium in the superior sector of patients with severe dry eye [3]. Recent studies reported reduced central epithelial and corneal stromal thicknesses in glaucoma patients. They reported also correlation between the number of topical medications with CET [1, 4, 5]. They also identified that the use of β -blockers was associated with a thinner epithelium [5]. Analysis by Myungsik Nam and Sun Woong Kim demonstrated that in addition to β -blockers, the number of instillations containing BAK was significantly associated with epithelial thinning [1].

It is no coincidence that beta blockers have been reported to be effective in restoring myopic regression by reducing CET [6]. The underlying mechanism requires is not well known. Alteration of the tear layer may be a direct factor in this change as well as the potential reduction in tear secretion by systemic effect his association supports a hypothesis that β -blockers may affect the measurement of CET by alteration of tear film thickness. Moreover, the effect of BAK on CET also could be explained by alteration of tear film thickness as it has been known to cause tear film instability [7].

Do prostaglandins also have an effect on epithelial thickness? What has been reported is that prostaglandins can have an effect on central corneal thickness and not directly on epithelial thickness [1]. As regards the effect of preservatives, there is no study objecting to a reversible effect immediately or in the short term after stopping use.

OCT is not the only way to assess corneal epithelial change. Scanning electron microscopy evaluation reveals ultrastructural epithelial changes that may not be seen on CET measurements of OCT in advanced stages [8]. At last, in studies with confocal microscopy, epithelial thinning was observed in patients with dry eye or long-term medical treatment with preserved eye drops [9].

Concerning the therapeutic implication of this factor, there

is no study. The rate of surveillance by OCT can be proposed according to the availability of this examination given its innocuity. However, the means available to preserve the ocular surface do not change and are summed up in the correct prescription of anti-glaucomatous eye drops. Choosing who and when to treat the patient. Always starting with monotherapy if possible. Favorizing eye drops without preservatives and fixed combinations.

The role of the central thickness of the epithelium is already known in the diagnosis of keratoconus and dry eye. Recently the role of this factor is clearly established with glaucoma. its exact therapeutic implication in terms of stopping or changing therapy remains to be determined by future studies.

Conflict of Interest: No potential conflict of interest relevant to this article was reported.

References

1. Myungsik Nam and Sun Woong Kim. Changes in Corneal Epithelial Thickness Induced by Topical Antiglucoma Medications.
2. Abou Shousha M, Wang J, Kontadakis G, Feuer W, Canto AP, Hoffmann R, Perez VL. Corneal epithelial thickness profile in dry-eye disease. Eye. 2020; 34:915-922.
3. Cui X, Hong J, Wang F, Deng SX, Yang Y, Zhu X, et al. Assessment of corneal epithelial thickness in dry eye patients. Optom. Vis. Sci. 2014; 91:1446-1454.
4. Batawi H, Lollett IV, Maliakal C, Wellik SR, Anderson MG, Feuer W, et al. A Comparative Study of Central Corneal Epithelial, Stromal, and Total Thickness in Males with and without Primary Open-Angle Glaucoma. Cornea. 2018; 37:712-719.
5. Halkiadakis I, Vernikou A, Tzimis V, Markopoulos I, Popeskou K, Konstadinidou V. Assessment of Corneal Epithelium Thickness in Glaucomatous Patients Undergoing Medical Treatment. J. Glaucoma. 2021; 30:44-49.
6. Sharma R, Dikshit S, Hoshing A, Vaddavalli PK. Effect of timolol on refractive outcomes in eyes with myopic regression after laser in situ keratomileusis: A prospective randomized clinical trial. Am. J. Ophthalmol. 2013; 156:413-414.
7. Petounis A, Akritopoulos P. Influence of topical and systemic beta-blockers on tear production. Int. Ophthalmol. 1989; 13:75-80.
8. Gilda Cennamo, Daniela Montorio, Salvatore Del Prete, Antonio Del Prete. Giovanni Cennamo Anterior-Segment Optical Coherence Tomography and Scanning Electron Microscopy to Evaluate Corneal Epithelial Changes in Patients Undergoing Glaucoma Therapy. Cornea. 2018; 37(12):1522-1526.
9. Emine Doğan, Burçin Köklü Çakır, Nilgün Özkan Aksoy, Erkan Celik and Ünal Erkorkmaz. Effects of topical antiglaucomatous medications on central corneal epithelial thickness by anterior segment optical coherence tomography. European Journal of Ophthalmology. 1-6.