Dramatic myopic shift due to epithelial basement membrane dystrophy

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Epithelial basement membrane dystrophy (EBMD), also known as map-dot-fingerprint dystrophy, is a common anterior corneal disorder affecting approximately 2% of the population [1]. It is characterised by the abnormal maintenance of the basement membrane, resulting in protrusions into the epithelium. These protrusions are typically described as subepithelial fingerprint lines, geographic maps and epithelial microcysts (or dots). The aetiology is believed to involve autosomal dominant inheritance, although the majority of cases are generally considered degenerative rather than strictly hereditary.

Presentation is often between the third and fifth decade of life with around 10% reported to develop painful recurrent epithelial erosions [2]. The presentation is characterised by ocular pain or blurred vision [2]. When present on the visual axis, the epithelial and subepithelial irregularities may result in irregular astigmatism and induction of higher order optical aberrations, sometimes described by patients as monocular diplopia or visual distortion.

While some patients with basement membrane abnormalities have an underlying genetic predisposition, others report a prior history of ocular trauma. Corneal abrasions can cause basement membrane disruptions, which typically heal within 8 to 10 weeks. Occasionally, basement membrane regeneration may be defective, resulting in duplications and the appearance of subepithelial maps, dots, and fingerprints.

Features of EBMD on anterior segment optical coherence tomography (AS-OCT) are described as: irregular and thickened epithelial basement membrane protruding toward corneal epithelium or hyperreflective dots.

Recurrent corneal erosions secondary to EBMD can be managed conservatively with ocular lubrication, cycloplegia and the application of bandage contact lenses. In cases where the condition leads to significant refractive changes or frequent corneal erosions, consideration may be given to interventions such as alcohol delamination of the corneal surface or occasionally phototherapeutic keratectomy.

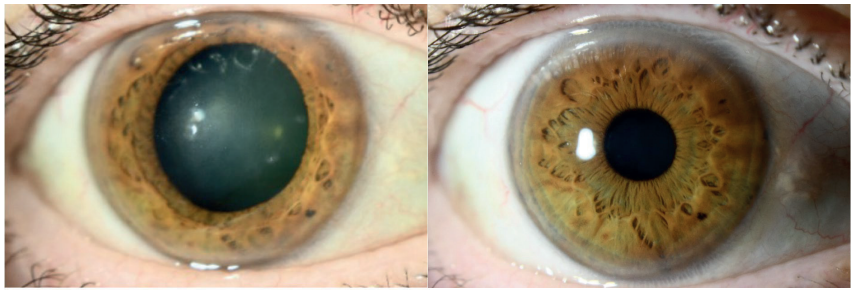

Figure 1: Slit-lamp photograph of right eye preoperatively and postoperatively presented from left to right respectively.

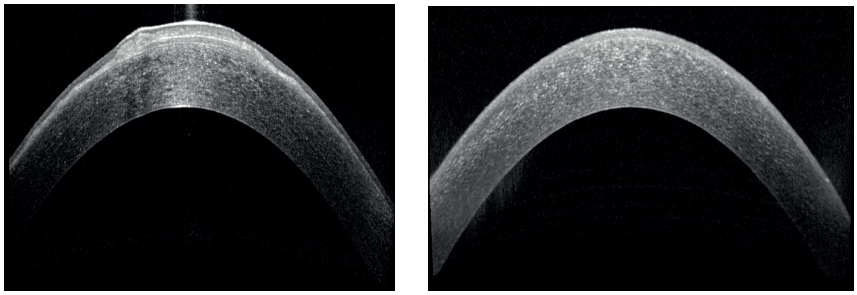

Figure 2: Anterior segment OCT of the right eye preoperatively and postoperatively presented from left to right respectively.

Case report

A 58-year-old female presented to a cataract assessment clinic with a one-year history of gradually worsening blurring of vision in the right eye with a significant myopic shift. Progressive nuclear sclerosis was suspected by the referring optometrist.

The patient had a background of type 2 diabetes mellitus, hypertension, and cervical carcinoma in situ. She was previously emmetropic with no ophthalmic history except a right corneal abrasion managed in the community.

Her best corrected visual acuities at presentation were 6/36 OD and 6/6 OS. The patient's refraction was -8.00DS OD and -0.75DS/-0.75DCx75o OS. Slit-lamp examination revealed prominent basement membrane duplications in the central cornea of the right eye, resulting in significant steepening of the anterior corneal curvature. Dilated fundal examination showed no lens opacity and normal posterior segments.

Baseline slit-lamp photography and AS-OCT is presented in Figure 1 and Figure 2 respectively. Corneal pentacam looking

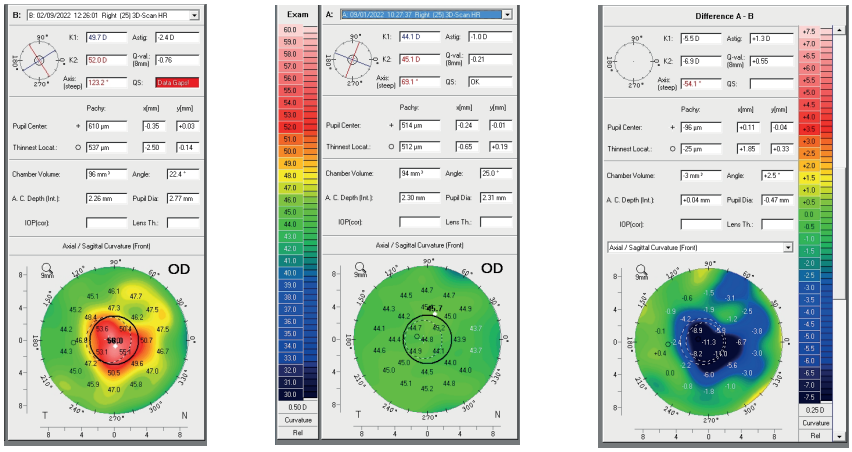

Figure 3: Corneal anterior curvature pentacam of the right eye before and after treatment and a difference map presented from left to right respectively.

at the anterior corneal axial curvature before and after the operation, as well as a difference map, are presented in Figure 3.

The patient underwent alcohol delamination of the right corneal epithelium. The histology later revealed focally disrupted Bowman's layer and variable epithelial thickness with sub-epithelial scarring – features of EBMD. A bandage contact lens was inserted postoperatively and preservative-free topical steroids and antibiotics were commenced. Three days postoperatively the visual acuities were 6/5 OU. Postoperative corneal topography revealed corneal flattening of the right eye and complete resolution of refractive error. Symptomatically, the blurring of vision resolved and the patient was pain free.

Discussion

Epithelial basement membrane dystrophy, in addition to being an important cause of recurrent corneal erosions, can cause visual impairment by inducing significant refractive changes. The importance of this condition is highlighted by the 7.5% incidence reported in patients undergoing cataract surgery evaluation [3]. Strategies suggested by Ho, et al. to improve its detection included retroillumination on slit-lamp; negative staining on fluorescence; and AS-OCT [4]. The management of patients with EBMD revolves around ocular lubrication to minimise the risk of corneal erosions. Alcohol delamination of the corneal epithelium is a potential treatment option for addressing recurrent corneal erosions. In unresponsive cases the usage of phototherapeutic keratectomy can be considered. A randomised control trial comparing alcohol delamination with phototherapeutic keratectomy for recurrent corneal erosions reported similar effectiveness for symptom resolution and an improvement in long-term pain for the alcohol delamination cohort [4].

This case report highlights the importance of a detailed examination of the anterior cornea prior to cataract surgery as unrecognised EBMD may lead to a postoperative refractive surprise.

References

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Declaration of competing interests: None declared.