

# Epithelial Basement Membrane Dystrophy and Visual Rehabilitation Using Rigid Gas Permeable Contact Lenses: A Case Report

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## Abstract

A 45 year old Indian male presented with complaints of monocular diplopia, blurry vision and burning sensation in each eye. On initial slit lamp biomicroscopy evaluation no overt abnormality was noted, but on instillation of sodium fluorescein dye a floral pattern was noted. After careful evaluation of the cornea using the iris retro-illumination technique, this so called floral pattern was found to be centrally located maps, dots and finger print patterns. Corneal topography confirmed the presence of astigmatism which had an irregular pattern in the left eye and on anterior segment optical coherence tomography sub epithelial linear hyper-reflectivity was noted in both eyes. The patient was diagnosed with epithelial basement membrane dystrophy.

He was managed conservatively with lubricants and rigid gas permeable contact lenses were prescribed to correct the astigmatism and corneal irregularity making use of fitting characteristics specific to the nature of the condition which completely resolved the patients symptoms.

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## Introduction

Epithelial basement membrane dystrophy (EBMD) is also known as Cogan's Microcystic Dystrophy or Map Dot Fingerprint Dystrophy. It results due to abnormal production of the basement membrane and adhesion complexes hence weakening the corneal epithelium leading to blurry vision, monocular diplopia, and recurrent corneal erosions (RCEs).<sup>1,2</sup>

The management for EBMD depends on the severity of the symptoms and could be surgical or non-surgical. We present a case of the management of visually significant Bilateral EBMD with contact lenses.

## Case Report

A 45 year old Indian male presented complaining of blurry vision with associated monocular diplopia, glare and burning sensation in both eyes (BE) even with spectacles for a year. He had no history of contact lens (CL) wear or ocular trauma; and systemic history was unremarkable.

Unaided visual acuity (VA) was right eye (RE) 20/50, N10 and left eye (LE) 20/40, N10 and with refraction of RE: -1.50/-1.50 × 180° and LE: -0.25/-0.50 × 90°, add +1.50 DS in both eyes (BE) he had VA of 20/20-2, N6 in each eye but there was no change in symptoms.

Slit lamp examination revealed a clogged Meibomian gland orifice on the upper eyelid margins of BE, but no other overt irregularity was noted. After the instillation of sodium fluorescein dye into BE, a 'floral pattern' was observed on the cornea with defined margins (Figure 1A & B), these were noted to be sub epithelial opacities resembling map and dot patterns on higher magnification (Figure 1C & D).

Tear breakup time (TBUT) was 4 seconds in BE and Schirmer's II scores were 12 mm in 5 minutes in BE.

Anterior Segment Optical coherence tomography (AS-OCT) showed linear hyper reflectivity within the epithelium of both corneas (Figure 1E). Corneal topography (Scheimpflug imaging, Allegro Wavelight, Oculyzer II) revealed irregular patterned astigmatism in the LE and mild skewing of axis in the RE (Figure 2).

His keratometry values were as follows:

RE: 7.90mm/7.61mm × 3.7

LE: 7.60mm/7.50mm × 46.6

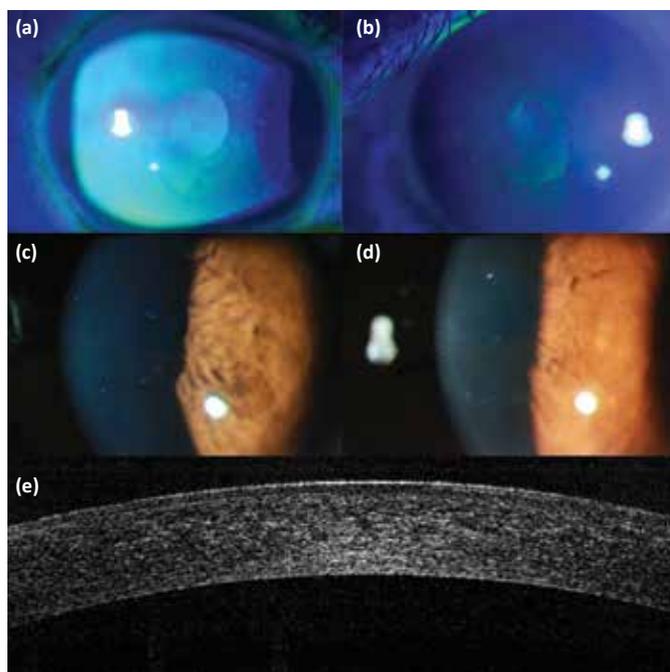
Other findings including intraocular pressures and dilated fundus examination were within normal limits.

Based on the above he was diagnosed with Bilateral EBMD, Compound Myopic Astigmatism and Presbyopia. He was advised topical Refresh liquigel QID (Allergan Inc) and Genteal gel eye ointment (Novartis) HS as lubricants and he was advised Rigid Gas Permeable (RGP) contact lens (CL) trial for BE.

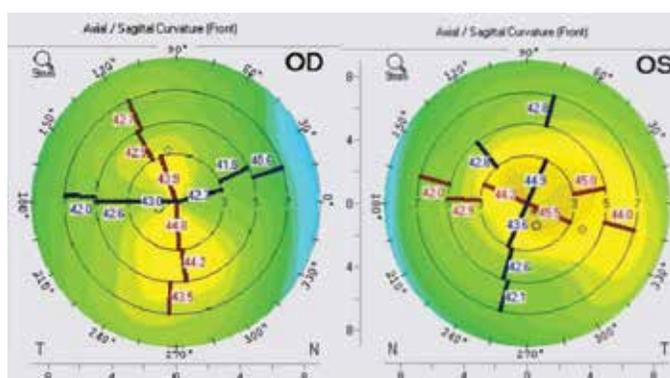
Taking into account the keratometry values and the horizontal visible iris diameter (11.0 mm in BE), a conventional aspheric tri-curve design RGP CL (Focon III with oxygen permeability (DK) of  $100 \times 10^{-11} \text{ cm}^2/\text{sec. ml O}_2/\text{ml} \times \text{mmHg}$ ) was selected. The lens was fit steeper than the flat keratometry value to avoid harsh bearing of the central cornea.

The final CL parameters were RE: 7.40mm/-5.00D /9.00mm and LE: 7.50mm/-3.00D/9.0mm and it exhibited diffuse central fluorescein pooling, adequate edge clearance with good movement and stability in BE (Figure 3). A VA of 20/20 and N6 with an Add of +1.50DS reading spectacles was achieved with no more glare or shadowing. This made the patient motivated to use the RGP CLs.

He was successfully wearing the contact lenses and at his 3 month follow up, he had an average lens wearing time of 8 hours daily and was adhering to the advised lens care regimen.



**Figure 1:** Floral pattern observed on the RE (a) and LE (b), map, dots and fingerprint pattern in the RE (c) and LE (d). AS-OCT image in the RE (e)



**Figure 2:** Note the irregular astigmatism as shown in the Axial/Sagittal map in both eyes



**Figure 3:** The CL fit in the RE, note the diffuse fluorescein centrally and the visible floral pattern

## Discussion

EBMD is characterized by map, dot and fingerprint patterns on the cornea. Maps are fibro-granular material within the corneal epithelium; while dots are deep seated pseudo-cysts, and fingerprints are curvilinear thin gray lines.<sup>3</sup> Bleb-like cysts may also be noted on retro-illumination and confocal microscopy associated with the other features described above.<sup>4</sup>

Prevalence of EBMD is about 5%<sup>5</sup> and the prevalence increases with age.<sup>6</sup> The 5q31 gene loci have been identified and mutations have been found in the transforming growth factor beta induced gene (TGFB1)<sup>7</sup> leading to alteration in within the epithelium.

In our patient the central location of the irregularity and astigmatism were significant to cause symptoms. Though we did not confirm the absence of higher order aberrations (HOAs) in this patient, but their effect in patients with corneal dystrophies is known to cause visual distortions.<sup>8</sup> High modulus soft contact lenses may also be tried though their ability to mask surface irregularities is not as good as RGPs.<sup>9</sup>

The goal of CL fitting in cases of corneal dystrophies is to reduce the visual symptoms without causing any harm to the cornea, hence an apical clearance RGP fit is preferred (fitting steeper than the flat keratometry reading) which allows for some tear exchange while preventing mechanical insult from the lens to the irregular central cornea.<sup>9</sup>

Surgery for EBMD is indicated in recurrent corneal erosions (RCEs) cases. The options include epithelial debridement with the option of anterior stromal puncture or diamond burr polishing and Phototherapeutic Keratectomy (PTK), though morphologic recurrence may be seen in upto 20% of patients.<sup>10</sup>

## Conclusion

Rigid contact lenses offer visual rehabilitation by correcting the irregular astigmatism and visual symptoms in EBMD and clinicians should consider this option when managing such cases. Careful examination of the cornea and detailed history is required to appropriately diagnose the condition.

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