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Sir,

### Hypopyon keratitis in corneal epithelial basement membrane dystrophy

Corneal epithelial basement membrane dystrophy (EBMD), also known as microcystic or map-dot-fingerprint dystrophy,<sup>1–5</sup> is a condition in which the attachment of basement membrane to the corneal epithelium is defective and may result in recurrent corneal erosion. Characteristically, the condition affects adults between the ages of 20 and 50 years, who present with corneal erosion often on waking. Although healing of corneal epithelium may take up to 6 weeks, secondary bacterial infection with hypopyon is uncommon. Three cases of EBMD with culture-positive microbial keratitis with hypopyon are presented and discussed.

#### Case reports

**Case 1.** A 34-year-old man with a known history of EBMD with characteristic 'maps' and 'fingerprint' lines presented with an acute episode of pain and was noted to have two areas of epithelial irregularity inferiorly on the right cornea, but no evidence of epithelial defect on fluorescein staining. He was treated with topical chloramphenicol and Voltarol (CIBA Vision) eye drops. Two days later he developed a small hypopyon with a central stromal infiltrate with thinned irregular

epithelium but no obvious defect on fluorescein staining. Following corneal scrapes for microbiological analysis, he was treated with intensive topical and oral ciprofloxacin, mydriatic, and flurbiprofen as a non-steroidal anti-inflammatory agent. Corneal culture grew *Pseudomonas* species which responded to treatment. There had been no history of contact lens wear. At 5 months visual acuity had improved to 6/6 with a small off-axis corneal scar.

**Case 2.** A 44-year-old man presented with a small right-sided corneal erosion with underlying stromal infiltrate and small hypopyon. There was evidence of EBMD in the fellow eye characterised by fingerprint lines. He was treated with intensive topical and oral ciprofloxacin. Corneal cultures grew *Staphylococcus aureus* which responded to treatment. He was subsequently lost to follow-up.

**Case 3.** A 40-year-old woman with a history of recurrent erosion presented with a further episode in the left eye having traumatised the area with a mascara brush 5 months previously. She had been treated 10 years earlier for an infected erosion in the right eye which resulted in a central corneal scar. Examination showed a small central epithelial defect with a small hypopyon. Epithelial microcysts in the fellow eye suggested an underlying basement membrane disturbance. She responded to intensive topical and oral ciprofloxacin and received topical mydriatic and oral doxycycline. Corneal culture grew *Staphylococcus aureus*. At 3 months a fine residual scar was present and acuity was recorded as 6/5.

#### Comment

Recurrent corneal erosion is often associated with corneal EBMD.<sup>1,5,6</sup> Erosions may be subdivided into two groups: microform erosions where a small break occurs in the epithelium and macroform erosions with a larger break and loosely attached epithelium which is often associated with trauma. EBMD may be characterised by the presence of microcysts, subepithelial map-like patterns and whorled fingerprint lines.<sup>2–5</sup> Studies have shown an abnormal thickened basement membrane underlying an abnormal epithelium. The dystrophic epithelium produces aberrant basement membrane and adhesion



Fig. 1. Case 1. Corneal epithelial changes.

complexes with inadequate hemidesmosomes and anchoring fibrils. Debris can then build up under the overlying loose epithelium resulting in erosion.<sup>2,7</sup> A large proportion of patients with EBMD remain symptomatic of erosion and are more likely to require continued treatment with topical lubricants.<sup>8</sup>

The majority of patients with erosions will respond to ocular lubricants and topical antibiotic cover in the acute phase with the removal of loose epithelium. The 3 cases presented were unusual in that they developed bacterial keratitis with hypopyon, resulting from a breach in the epithelium, allowing bacteria access to the underlying stroma.

All 3 patients responded well to ciprofloxacin monotherapy with resolution of hypopyon keratitis. Bacterial keratitis can result from a break in the corneal epithelium allowing bacteria access to the corneal stroma, where they multiply and spread, sometimes releasing toxins and enzymes. In the cases presented organisms may already have been present in the conjunctival fornices, becoming pathogenic when an epithelial break was incurred.

Interestingly, recurrent erosion has been associated with lid margin disease. Oral tetracycline has been shown to be effective in the treatment of meibomian gland dysfunction and also in recalcitrant corneal erosion, significantly reducing the time for erosions to heal.<sup>9,10</sup> Its mechanism of action is not fully understood, but may be unrelated to its antibacterial action. Tetracycline may inhibit lipid synthesis in meibomian glands<sup>11</sup> and binds to conjunctiva and goblet cells.<sup>12</sup> It also has an anti-collagenolytic activity,<sup>13,14</sup> inhibits metalloproteinases and may suppress connective tissue breakdown.<sup>15</sup>

Ciprofloxacin is a potent fluoroquinolone with broad spectrum antimicrobial action and a low incidence of resistance.<sup>16</sup> However, with topical use a precipitate may form at the superficial portion of the corneal defect.<sup>17</sup> This may be troublesome in EBMD and could impair epithelialisation. However, a precipitate did not occur in any of the cases presented. Precipitation is unrelated to the sex of the patient, causative organism, size or depth of the lesion or, indeed, the time for the defect to heal. More importantly, it is most often observed in patients over 60 years of age.<sup>17</sup> Patients with EBMD tend to be in a younger age group, and so this problem should be less likely to arise.

The presence of a stromal infiltrate with hypopyon is related to the severity of corneal inflammation and is often associated with an infected corneal lesion, requiring full microbiological investigation. Although the majority of corneal erosions are not infective, this series of three cases emphasises the need to be alert to the possibility of underlying infection.

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Sir

#### **Bilateral keratomalacia in a cachectic scleroderma patient**

It is estimated that 124 million children world-wide are vitamin A deficient, making it the world's second most prevalent nutritional disorder after protein energy malnutrition. Of these, 5 million will develop xerophthalmia and between 250 000 and 500 000 will become blind.<sup>1</sup> In the more developed parts of the world vitamin A deficiency is rarely encountered. We report an unusual case of corneal melting (keratomalacia) caused by nutritional deficiency of vitamin A secondary to scleroderma (CREST type). In developed countries clinical xerophthalmia due to low vitamin intake has been reported in food faddists and psychiatric patients.<sup>2</sup> Deficiency has also been reported in cases of chronic