in the differential diagnosis of lacrimal gland lesions and exenteration is the treatment of choice.

Conflict of interest

The authors declare no conflict of interest.

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Eye (2013) **27,** 104–105; doi:10.1038/eye.2012.200; published online 23 November 2012

Sir,

Rapid corneal adrenochrome deposition from topical ibopamine in the setting of infectious keratitis

Owing to its ability to act as both a direct and indirect sympathomimetic agonist, topical ibopamine has been used to treat chronic refractory hyptotony.[1] Ibopamine is rapidly hydrolyzed by corneal esterases to epinine, which then undergoes the same *in vivo* oxidation process as epinephrine to form adrenochromes. In acidic mediums, ischemic environments, and in the presence of reactive oxygen species adrenochrome becomes unstable and can undergo autooxidation to its melanin degradation products.[2,3] Although corneal pigmentation from topical epinephrine has been observed,[4] and such depositions have been reported on a Boston keratoprosthesis with the use of ibopamine,[5] such deposition from ibopamine has not, to our knowledge, been reported in the cornea itself.

Case report

A 50-year-old HIV-positive man underwent a penetrating keratoplasty in his left eye for a failed endothelial graft in the setting of significant anterior stromal scarring. He had a complex ocular history including cytomegalovirus retinitis status post ganciclovir intravitreal implants bilaterally and immune reconstitution uveitis status post flucinolone intravitreal implants bilaterally. He also had chronic hypotony in both eyes for which he was started on ibopamine 2% eye drops three times daily (compounded at Leiter's Pharmacy, San Jose, CA, USA) 3 months before the penetrating keratoplasty. Pre-operatively, the ibopamine use resulted in an increase in intraocular pressure from 5 to 7 mm Hg. After surgery, no epithelial defect was seen, and in addition to the ibopamine eye drops, routine topical antibiotic and corticosteroid coverage with polymixin B-trimethoprim and prednisolone acetate 1%, respectively, each four times daily was given. A peripheral corneal epithelial defect was seen 1 week post-operatively, and the defect persisted despite aggressive lubrication and tapering of his post-operative corticosteroid eye drops. Cultures were not taken at this point, as there was no clinically obvious infiltrate present.

Five weeks post-operatively, a brown-pigmented deposition appeared within the margins of the epithelial defect in the nasal peripheral corneal graft (Figure 1). The pigmentation was concentrated as a plaque overlying the de-epithelialized cornea and extended diffusely into the anterior one-third of the cornea. The underlying and surrounding cornea demonstrated stromal infiltrate with a hazy appearance and poorly demarcated edges. A piece of the pigmented plaque was excised at the slit lamp and was sent for culture and histopathology. He was started empirically on moxifloxacin drops hourly for presumed infectious keratitis. Gram stain revealed Gram-positive cocci and cultures grew *Streptococcus viridans* and Haemophilus species resistant to moxifloxacin, but sensitive to cefazolin. The moxifloxacin was changed to fortified cefazolin 50 mg/ml, as well as gentamicin 14 mg/ml for synergy, and his infectious keratitis improved markedly. At follow-up visits, the superficial pigmented plaque was further debrided, but the intrastromal component accumulated within the margins of his large persistent epithelial defect. Histopathology revealed pigmented acellular material on hematoxylin/eosin stain sections that stained positively for melanin by

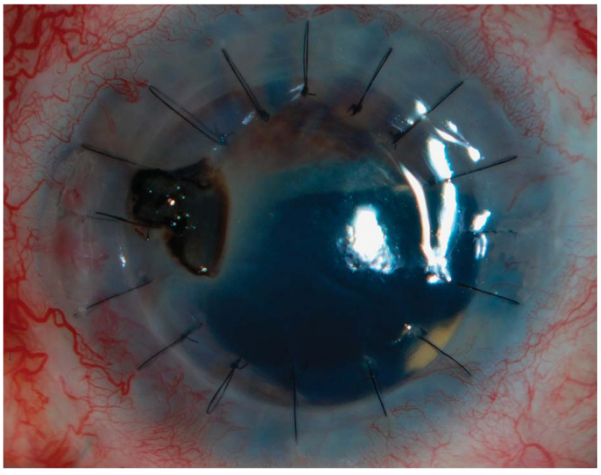

Figure 1 Slit lamp photograph of the pigment deposition in the cornea.

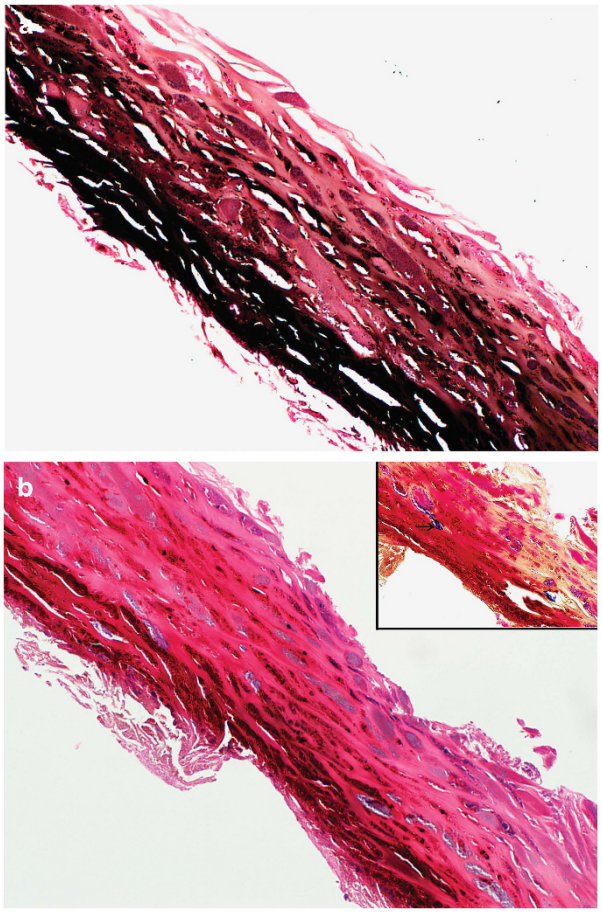

Figure 2 (a) Fontana Masson stain of corneal biopsy demonstrating pigmented granules that stain positively, indicating the presence of adrenochrome (× 20). (b) Hematoxylin and eosin stain corneal biopsy demonstrating pigmented, acellular intrastromal material (× 20). Epithelium and Bowman's membrane are absent, consistent with clinical defect. Gram stain demonstrates diffuse intralamellar Gram-positive cocci (insert, arrow).

Fontana Masson, but negatively for iron (Figure 2). At this point, the ibopamine drops were discontinued.

Comment

Bacterial organisms can produce condition that promotes adrenochrome autoxidation. An acidic environment is created by the formation of lactic acid as the major metabolic end-product of carbohydrate fermentation by *S. viridans*. In our patient, the concurrent infection with *S. viridans* may have facilitated the oxidation of ibopamine into its degradation products, resulting in the rapid pigment deposition in the cornea. It is also possible that the deposition would have occurred even without the favorable environment created by the infectious keratitis. Animal models have shown that for pigment deposition to occur, oxidized adrenochrome and a susceptible corneal surface must be present,[6] a condition satisfied by our patient's persistent epithelial defect. Thus, based on our observations, patients using topical ibopamine eye drops should be carefully monitored for pigment deposition in the cornea, particularly in the presence of a compromised epithelial surface.

Conflict of interest

The authors declare no conflict of interest.

Acknowledgements

This work was supported in part by That Man May See, Inc, Research to Prevent Blindness, Heed Ophthalmic Foundation (CCL), and R01 FD003708-01 (BHJ).

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Eye (2013) **27,** 105–106; doi:10.1038/eye.2012.217; published online 19 October 2012

Sir,

How common is inflammatory marker-negative disease in giant cell arteritis?

Giant cell arteritis is an inflammatory vasculitis affecting medium- and large-sized arteries and can result in arteritic anterior ischaemic optic neuropathy. C-reactive protein