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Abiotrophia adiacens-related infectious crystalline keratopathy following penetrating keratoplasty

We present a novel case report of *Abiotrophia adiacens*-related infectious crystalline keratopathy (ICK) following penetrating keratoplasty (PK). A 52-year-old man with keratoconus presented with decreased vision 6 weeks after his third PK, having previously had uncomplicated surgery. His immediate postoperative course was uneventful. Topical corticosteroids (prednefrin forte, 0. 1%) and chloramphenicol eye-drops were initially applied four times daily, tapering to twice daily. Visual acuity was 6/60 (best-corrected visual acuity 6/36) in his affected eye and 6/36 in his unaffected eye. The slit-lamp examination revealed a focal area of non-suppurative, intrastromal white opacities exhibiting a branching, cracked-glass appearance; this was evident inferiorly, without any epithelial defect. No loose or broken sutures were noted.

Provisional microscopic examination of corneal scrapings, performed for diagnostic smears and cultures, revealed no bacteria on Gram stain after 48 h of incubation. Topical steroids were withdrawn to treat the patient presumptively with ciprofloxacin and non-steroidal eye-drops. One week later, cultures revealed heavy growth of Gram-positive cocci—*Abiotrophia adiacens*—sensitive to ciprofloxacin, which was continued. The corneal wound infiltrate indicated a more suppurative appearance after steroids were stopped. The infection responded well to the antibiotic and resolved within 7 weeks. Visual acuity in the affected eye improved to 6/12.

Species of the genus *Abiotrophia*, identified by Fenkel and Hirsh in 1961,[1] were long considered to be nutritionally variant streptococci; the term *Abiotrophia*—befitting its ''life nutrition deficiency''—was adopted only in 1995.[2] These small alpha-haemolytic satellite colonies require nutrient-enriched supplemental media (pyridoxal hydrochloride, 0.001%; L-cysteine, 0.01%) for growth. Normal inhabitants of the oral and respiratory flora, they have been incriminated in serious diseases, including brain abscess, endocarditis, osteomyelitis and prosthetic infections.[3] *Abiotrophia adiacens* have not been reported as a cause of ICK, despite earlier reports in endophthalmitis, neonatal conjunctivitis and equine microbial keratitis.[4] In 1991, Ormerod and colleagues described four cases of nutritionally variant streptococci isolated in ICK patients;[5] further characterisation of their isolate was limited due to the lack technological advancement (eg, intergenic spacer region signature sequences or 16S rRNA gene sequencing) at that time.

Meisler and coworkers used the term *ICK*, first described by Gorovoy and colleagues[6] to describe an indolent corneal infection characterised by fern-like, branching crystalline opacities in the absence of inflammation. ICK has also been implicated in LASIK, incisional keratotomy, epikeratophakia, contact lenses and topical anaesthetic abuse.[6] The bacterium appears to gain access through an epithelial defect, replicate, and spread along the collagen lamellae. No inflammatory response is elicited in the eye hypothesised secondary to concomitant steroid use or assembly of the organisms' biofilm.

Response to antibiotic therapy is often slow or ineffective due to deep stromal sequestration of the organisms or apparent antibiotic resistance secondary to inductive bacterial factors produced by certain relatively deficient nutrients in the grafted cornea.[5] Curiously, in this case study, the agent responded well to presumptively prescribed ciprofloxacin, which is usually poorly effective against Gram-positive organisms. Perhaps the discontinuance of the steroids was more important, allowing host defence mechanisms to eliminate this bacterium. Eye infections are usually sufficiently addressed with the discontinuation of topical steroids and aggressive antibiotic therapy, but continued infection, vascularisation or scar formation may affect visual acuity and require lamellar or PK. Intervention with Nd:YAG laser disruption creates a diffuse haze of the protective glycocalyx matrix within the intrastromal crystals, making the organism drug-susceptible. This should be considered before more extensive surgical steps are undertaken.

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MAILBOX

Femtosecond laser versus manual dissection for top hat penetrating keratoplasty

We read the article by Bahar *et al* with much interest.[1] We agree with the authors that IntraLase-enabled top hat penetrating keratoplasty (IEK) and manual top hat penetrating keratoplasty (TH-PKP) are safe

and stable procedures that result in higher endothelial cell counts then for conventional PKP. However, we do not think that their statement that IEK results in less astigmatism and better best spectacle-corrected visual acuity (BSCVA) in comparison with manual TH-PKP can be justified.

In their study 23 consecutive patients underwent IEK. In the recipient cornea, the mean anterior side cut diameter was 7.51 mm. The donor cornea was oversized by 0.2 mm in all cases. This means that the mean anterior side diameter of the donor cornea was 7.71 mm.

Thirty-six patients underwent TH-PKP. A 7.0 or 7.5 mm Hanna trephine was used to make a circular 0.4 mm deep incision from the epithelial side of the donor cornea. The mean anterior side cut diameter of the donor corneas obtained was not mentioned. It should be between 7.0 and 7.5 mm, presumably about 7.3 mm.

This means that the mean anterior diameter of the donor corneas in the IEK patients was larger than the anterior diameter of the donor corneas in the TH-PKP patients. A larger graft diameter results in better optical performance.[2] A 7.5 mm (or 7.71 mm) anterior diameter is a good option for TH-PKP.[3] Our results for TH-PKP with an anterior diameter of 7.5 mm were better than the results of IEK in this study.[3] A 7.0 mm anterior graft diameter is too small for a reasonable optical performance and will only rarely be justified.[2]

It is obvious that a larger anterior side diameter of the donor cornea will result in better BSCVA. This has nothing to do with IEK or TH-PKP. We think that the conclusion that IEK results in less astigmatism and better BSCVA in comparison with manual TH-PKP is unsubstantiated.

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Enhanced visualisation of the vitreous during bimanual vitreous shaving by trans-scleral illumination

We would like to congratulate Veckeneer and Wong for reporting a modified technique of our previously described trans-scleral, diaphanoscopic illumination of the peripheral vitreoretinal interface in eyes with retinal detachments (RD).[1 2] They injected, after a cor vitrectomy and induction of a posterior vitreous detachment, perfluorocarbon liquid (PFCL) into the vitreous cavity up to the retinal tear. The double light reflex from the reflected surface of the PFCL bubble and the modified transmitted light source ''lightindentor'' amplified the low transilluminated light. In addition, they injected triamcinolone to increase the scattering of the moved crystals in the peripheral vitreous. Using this technique, the authors could significantly increase their primary success rate in RD.

We have performed diaphanoscopic illuminations for more than 10 years, and with this technique in 205 eyes with severe RD (holes greater than 90°, holes posterior to the equator or proliferative vitreoretinopathy grade C), we have achieved a complete reattachment in 195 eyes (95.2%) with one or two interventions respectively.[3] Recently we also recommended the use natural or vital dyes to stain preretinal structures during challenging vitreoretinal surgery (chromovitrectomy).[4] It is mandatory to remove the entire vitreous in eyes with severe diabetic vitreoretinaopathy. However, these eyes frequently have damage to the blood–retinal barrier, and a fluorescein angiography the day before surgery will lead to a significant leakage of the fluorescein dye from the retinal vessels into the vitreous fibres, thus enhancing the scattering of trans-scleral light in the peripheral vitreous.[5]

Proper cleaning of the vitreous base and the use of heavy liquids, for example perfluoro-n-octane, may even allow a simple aqueous tamponade for the repair of primary pseudophakic rhegmatogenous RD. Martínez-Castillo *et al* performed a vitrectomy in 60 eyes with RD with an injection of perfluoro-n-octane to attach the retina, followed by trans-scleral diode laser retinopexy.[6] The perfluoro-n-octane was replaced by a balanced salt solution tamponade. Primary retinal reattachment at 1 month was 98.3%. At the 12-month follow-up visit, the retina was reattached in all 60 eyes (100%).

A complete removal of vitreous adhesions is the key factor to release their traction on the retinal surface. Enhanced visualisation by chromovitrectomy and trans-scleral illumination is mandatory to achieve this goal.

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Authors' response

We thank Drs Schmidt, Mennel, Rodrigues and Meyer for their enthusiastic response to our paper ''Visualising vitreous through modified trans-scleral illumination by maximising the Tyndall effect.''

In response to their letter, we would like to emphasise a few aspects of our modified technique:

1. In order to appreciate and use the double light reflex as described in our paper, it is mandatory to fill the vitreous cavity up to and beyond the retinal breaks. This also prevents triamcinolone crystals from entering the subretinal space and thus reduces the risk of toxic side effects.[1]
2. Although we would like to agree with the statement that this technique improves outcome in retinal detachment surgery, the numbers are to small to show any significant benefit.
3. Other advantages of the modified trans-scleral illumination method deserve to be mentioned.
   – The combination of indentation by the surgeon with wide-angle viewing reduces the required height of indentation to achieve good visualisation, thereby minimising volume and pressure changes in the vitreous cavity. Complications such as subretinal PFCL

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Notes