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Clostridium novyi keratitis

Anaerobic bacteria are rarely implicated in corneal infections. In our laboratory, only 3 of a series of 432 bacterial isolates from the cornea were anaerobes (*Clostridium perfringens*, *Peptostreptococcus anaerobius*, *Propionibacterium acnes*). This fraction is not unusual. The value of anaerobic culture for corneal specimens may be open to question, but we recently had a patient in whom the diagnosis would not otherwise have been made.

Case report

A 73-year-old man presented to a general practitioner. He had received a corneal laceration when struck by an Australian magpie. He was given chloramphenicol 1% ointment, but experienced increasing pain, redness and visual loss over the next 2 days. The patient was referred to Flinders Medical Centre, South Australia, Australia. A partial thickness, 4-mm-long shelving wound was seen across the visual axis. It was associated with a large grey infiltrate. Corneal oedema, Descemet's folds, and cells in the anterior chamber were also present. Visual acuity was perception of hand motions.

Scrapings were taken, and media were inoculated for bacterial, fungal and viral investigations. Chloramphenicol was discontinued, and cefazolin 5% and gentamicin 1% drops were given hourly, as is our standard practice.¹

Gram stain showed polymorphonuclear cells and Gram-positive bacilli. The organism appeared on blood agar after 48 h of incubation at 35°C in an anaerobic chamber. A clostridial species was suspected, but a reverse-CAMP test suggested that it was something other than *C. perfringens*, the species isolated most commonly from tissue.² Tests for fungi and herpes viruses were negative.

The patient's condition stabilised and then improved steadily. The drops were reduced to 4-hourly after 5 days, and gentamicin was stopped 3 days later. After another 3 days, the patient's visual acuity was 6/24, and the treatment was changed to chloramphenicol ointment and fluorometholone 0.1% drops twice daily. One month after referral, the patient had a residual scar with minimal shelving. Treatment was stopped.

The isolate swarmed over the agar, was a strict anaerobe and had cells with subterminal swellings. In speciation tests, lecithinase and lipase activities were detected. No reactions were seen in a rapid ID32A strip (BioMérieux, Marcy l'Etoile, France), so DNA sequencing was performed. Cells were incubated in lyso-

zyme (1 mg/ml) for 1 h at 37°C, and DNA was purified using a Wizard Genomic Kit (Promega, Annandale, New South Wales, Australia). The 5' region of the 16S rRNA gene was amplified using universal primers 27F³ and 787r.⁴ The reaction mixture included 2 µl of DNA and 0.4 µM of each primer in a final volume of 50 µl. Amplification conditions were 94°C for 3 min, 30 cycles of 94°C for 30 s, 60°C for 45 s and 72°C for 1 min, and a final extension at 72°C for 5 min. The product (707 bases) was purified using GeneClean (QBIogene, Carlsbad, California, USA), sequenced using BigDye Terminator V.3.1 in an ABI Prism 3100 Analyzer (Applied Biosystems, Foster City, California, USA) and compared with sequences in GenBank using FASTA.⁵ It was identical to four strains of *C. novyi* from three laboratories, including the type strain of *C. novyi* type A (ATCC 17861).⁶ The next closest matches, from strains of *C. botulinum*, differed by 14 bases.

Comment

The Australian magpie (*Gymnorhina tibicen*) is a common bird whose carolling is evocative of Australian life. Although generally well regarded, they become aggressive to humans when nesting. The eye is involved in 20% of presentations to hospitals after attacks.^{7,8} *C. novyi* has been cultured from soil and animals,⁶ and we suspect that the magpie was the source of infection in our patient.

C. novyi is an agent of gas gangrene. With respect to the eye, it has been isolated from conjunctival discharge in a girl with anophthalmia.⁹ Corneal infection has not been reported. Type A strains produce γ-toxin (lecithinase), δ-toxin, ε-toxin (lipase), and the lethal α-toxin.¹⁰

In general, clostridia are susceptible to chloramphenicol, have variable susceptibility to cephalosporins and are resistant to aminoglycosides. The high antibiotic concentrations achievable in the cornea with fortified drops may have contributed to the good outcome here. Other antibiotics that can be given topically and may be useful in clostridial keratitis include penicillin G and clindamycin.²

Paul R Badenoch, Richard A D Mills

Department of Ophthalmology, Flinders Medical Centre, Bedford Park, South Australia, Australia

Mark W Woolley, Bruce I Wetherall

Department of Microbiology and Infectious Diseases, Flinders Medical Centre, Bedford Park, South Australia, Australia

Correspondence to: Paul Badenoch, Department of Ophthalmology, Flinders Medical Centre, Bedford Park, South Australia 5042, Australia; p.badenoch@flinders.edu.au

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Drug-induced cicatrising granulomatous conjunctivitis

Ocular toxicity resulting from chemicals in eye drops is common. Preservatives such as benzalkonium chloride (BAC) and related quaternary ammonium salts have been shown to play an important part in these reactions.¹ The symptoms can range from mild injection and itching to severe conjunctival reactions. The term pseudophemphigoid has been applied to drug-induced cicatrising conjunctivitis.²⁻⁵ We present a patient who developed drug-induced granulomatous cicatrising conjunctivitis secondary to glaucoma drops.

Case report

A 60-year-old man presented to the eye clinic for ocular irritation. His ocular history was positive for glaucoma, for which he was using latanoprost (Xalatan, Pfizer, New York, New York, USA), and brimonidine 0.2% (a generic preparation). Examination showed severe conjunctival injection bilaterally, as well as symblephara in the lower eyelid (fig 1A). A conjunctival biopsy showed non-caseating granulomatous inflammation within the substantia propria (fig 1B). The differential diagnosis for granulomatous conjunctivitis includes sarcoidosis and infections.⁶ Sarcoid investigation by rheumatology was negative, and the patient did not have a history or symptoms of an infection.

He returned to clinic, at which time an allergic reaction was suspected. Initially, brimonidine was discontinued, followed by latanoprost when the injection did not resolve. The patient was treated with prednisolone acetate 1%, which brought about a resolution of the conjunctival injection and irritation.

To control his intraocular pressure, different glaucoma drops were tried, but the conjunctival injection and irritation quickly resumed each time. These drops included timolol 0.5%, brinzolamide 1% (Azopt, Alcon, Fort Worth, Texas, USA), dorzolamide 2% (Trusopt, Merck, Whitehouse Station, New Jersey, USA), bimatoprost 0.03% (Lumigan, Allergan, Irvine, California, USA) and pilocarpine 1%. Each time, discontinuing the eye drops and prescrib-