

Mycobacterium chelonae keratitis: a case report

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SUMMARY The case is reported of a patient who initially presented with a dendritiform corneal ulcer that ultimately failed to heal and in which *Mycobacterium chelonae* was repeatedly cultured. The organism was sensitive only to kanamycin and amikacin; however, topical administration of these antibiotics failed to achieve a complete cure. Penetrating keratoplasty was ultimately required to eradicate the organism from the cornea.

Mycobacterium chelonae, along with *Mycobacterium fortuitum*, belongs to group IV (rapid growers) in Runyon's classification of atypical mycobacteria.¹ They are differentiated in the laboratory by the nitrate reduction test and iron uptake test: both tests are negative for *Mycobacterium chelonae* and positive for *Mycobacterium fortuitum*.² Treatment is difficult and protracted because both pathogens are resistant to most antituberculous drugs and are generally sensitive only to kanamycin or amikacin.^{3–5} *Myco. fortuitum* is probably a more common cause of keratitis, with at least 9 cases having been reported.^{6–10} We are aware of only 2 cases of keratitis due to the *Myco. chelonae*.^{5,11} In this paper we describe the course of a patient with an indolent corneal ulcer from which *Mycobacterium chelonae* was isolated and who ultimately required penetrating keratoplasty.

Case report

An otherwise healthy 84-year-old white woman complained of a foreign body sensation in the left eye after raking leaves. Her ophthalmologist noted a dendritic-like ulcer, and treated it for 5 weeks with idoxuridine, trifluoridine, and a combination of sulphacetamide, prednisolone acetate, and phenylephrine. After an initial improvement there was no further healing, so she was referred to the Department of Ophthalmology, Medical College of Georgia.

Her visual acuity was 20/50 OD (aphakic with hard contact lens) and finger counting at 1 foot (30 cm) OS.

There was a mild entropion of the left lower lid and a moderate ciliary flush. A linear 1 mm central epithelial defect was surrounded by a faint sub-epithelial infiltrate with scarring and discrete punctate epithelial erosions. The anterior chamber was deep and clear.

She was treated for a clinically apparent post-infectious ulcer with erythromycin ophthalmic ointment and pressure patching; however, the defect did not heal. After 18 days' therapy the cornea was scraped for culture and plated on blood agar, and the medication was changed to a combination polymyxin B, neomycin, and gramicidin ophthalmic drops every 2 hours. A Fox procedure was performed to correct the entropion. By the fifth day a confluent growth of acid-fast bacilli was present on the blood agar which was subsequently identified *Mycobacterium chelonae*.

A 5% hypopyon developed, and the patient was admitted to the Talmadge Memorial Hospital for more intensive treatment. The initial therapy suggested by the infectious diseases consultant was topical kanamycin 30 mg/ml drops hourly, alternating at 30-minute intervals with topical doxycycline 30 mg/ml drops hourly. The cornea was again scraped for culture prior to starting these antibiotics and again yielded *Myco. chelonae*. Because of the lack of response the previous medications were stopped, and topical amikacin 30 mg/ml drops every half hour were begun. During the next few days the epithelial defect decreased in size, the infiltrate showed evidence of clearing, and the hypopyon resolved. She was discharged from the hospital with erythromycin ophthalmic ointment as the only medication. One month later the epithelium had healed, but the visual acuity was unchanged.

The ciliary flush then increased after 3 weeks and

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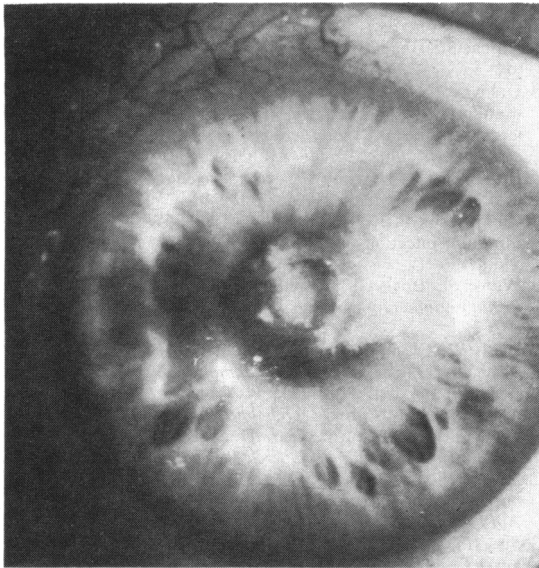


Fig. 1 Appearance of mycobacterium chelonae corneal ulcer at the time of recurrence.

was accompanied by an anterior chamber reaction. A 'cracked windshield' appearance of the cornea was noted; however, the corneal epithelium was intact. Prednisolone sodium phosphate 0.125% twice daily was reluctantly added. The anterior chamber reaction and the patient's discomfort increased further during the next few days, and the prednisolone sodium phosphate was increased to 1% 4 times a day. The ulcer recurred in 4 weeks (Fig. 1), and she was treated in the hospital with topical amikacin 30 mg/ml drops and sulphacetamide 30% hourly. The ulcer did not resolve, and repeat cultures continued to yield acid-fast organisms. Because of the lack of microbiological and clinical response a 7.5 mm penetrating keratoplasty was performed on 24 March 1982. Initial postoperative medications were topical amikacin 30

Table 1 Antimicrobial agent sensitivity of *Mycobacterium chelonae* isolated in this case

Agent	MIC $\mu\text{g/ml}$
Amikacin	4
Cefotaxime	64
Cefoxitin	32
Doxycycline	>16
Erythromycin	>16
Gentamicin	16
Kanamycin	4
Moxalactam	>128
Sulphamethoxazole	256
Ethionamide	128
Tobramycin	8

MIC = minimal inhibitory concentration in broth.

mg/ml drops 4 times a day and prednisone 20 mg orally per day. Six months later the graft was clear and the patient was comfortable, and there was no evidence of recurrence. *Mycobacterium chelonae* sensitive only to amikacin and kanamycin (Table 1) was isolated from 7 separate cultures, including that of the excised cornea, taken over a 6-month period.

Discussion

We believe this is the third published case of *Mycobacterium chelonae* keratitis. The initial presentation of a dendritic ulcer and infiltrate with a history of antiviral medication was similar to the case reported by Gangadharam *et al.*¹¹ A 'cracked windshield' appearance of the cornea, which was described by Lazar *et al.*¹⁰ as an early, transient, and almost pathognomonic sign of *Myco. fortuitum* keratitis, did not occur until late in this case and persisted for several weeks.

Sensitivity of the organism to amikacin and kanamycin was consistent with reports of in-vitro disc diffusion and agar dilution tests,^{3,4} and with drug sensitivities in reports of *Myco. chelonae* infections other than keratitis.^{12,13} A previous report had noted that amikacin inhibited 100% of *Myco. fortuitum* isolates at 2 $\mu\text{g/ml}$ whereas 91% of *Myco. chelonae* had minimum inhibitory concentrations of 4 $\mu\text{g/ml}$ or greater,⁴ as was found in this case (Table 1). We are not certain what levels of amikacin were achieved in the corneal stroma during treatment. It has also been previously reported that doxycycline is useful in the treatment of this organism⁵ and that 44% of strains are inhibited by 4 $\mu\text{g/ml}$ doxycycline with 14% of strains being susceptible to 2 $\mu\text{g/ml}$ erythromycin.⁴ The minimum inhibitory concentration for this organism was greater than 16 $\mu\text{g/ml}$ for both doxycycline and erythromycin (Table 1). A previously reported case of *Myco. chelonae* keratitis was sensitive only to gentamicin¹¹; however, resistance to amikacin or kanamycin was not specifically noted. This organism was sensitive to 16 $\mu\text{g/ml}$ gentamicin.

We are confident that the organism was indeed *Mycobacterium chelonae*, since it was isolated from multiple cultures taken weeks apart and characterised by 2 separate laboratories. Acid-fast bacilli and granulomatous inflammation were not found in the recipient corneal specimen, which showed only nonspecific inflammation. This was consistent with the repeated difficulty in finding histological evidence of mycobacteria in experimentally produced rabbit *Mycobacterium fortuitum* infections as reported by Kirber *et al.*¹⁴ While we were initially successful in healing the ulcer and promoting re-epithelialisation by a prolonged course of topical medications, the organism was evidently still present in the corneal

stroma. The necessity of treating her iritis with topical steroids after epithelialisation was accomplished may have hastened the emergence of recurrent disease, which ultimately required a penetrating keratoplasty for definitive treatment.

The treatment of infections of the soft tissues with *Myco. fortuitum* or *Myco. chelonae* has frequently included excision or debridement.⁵ Of the two previously reported cases of *Myco. chelonae* keratitis one was successfully treated with topical amikacin,⁵ but the other required penetrating keratoplasty.¹¹ This case has demonstrated the potential value of penetrating keratoplasty, if it is done while adequate infection-free margins are still present, for the treatment of *Myco. chelonae* keratitis that fails to respond to medical therapy.

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