Nocardia gypsoides corneal ulcer

P. J. MEURS AND O. P. VAN BIJSTERVELD

From Koninklijk Nederlands Gasthuis voor Ooglijders, FC Dondersstraat 65, 3572 JE Utrecht, Holland

SUMMARY *Nocardia gypsoides*, a species characterised by its ability to produce calcium sulphate granules, has been isolated for the first time from a corneal ulcer. In vivo this pseudomycete also forms gypsum. Every effort should be made to identify Actinomycetales to species level. The names *Leptothrix* and *Streptothrix* should be abandoned.

Actinomycetales, because of their resemblance to mycotic agents and because they often cause diseases resembling mycotic infections, have in the past been referred to as fungi. However, there is no doubt that these agents are bacteria. They are now known as pseudomycetes.

Traditionally ophthalmologists have separated *Streptothrix* and *Leptothrix* from Actinomycetales as specific agents. Evidence, however has shown these organisms to belong to the anaerobic genus *Actinomyces* and the aerobic genus *Nocardia* respectively, of the order of Actinomycetales.¹

Probably more than a single species of both *Actinomyces* and *Nocardia* cause a wide variety of ocular infections, and therefore much information is lost as to the relation of species of both genera to the type of ocular disease produced.

There have been few reports of nocardia infections of the cornea.²⁻⁶ Invariably the species isolated was *Nocardia asteroides*. We have isolated from a corneal ulcer *Nocardia gypsoides*,⁷ not known before to be associated with ocular disease.

Case report

The patient, a 65-year-old navy, was first seen at the outpatient department of the Eye Clinic in September 1982. The disease in the left eye had started several weeks earlier; there was no history of trauma or foreign body. The patient complained of irritation and pain, tearing, and a moderate discharge from that eye. Several years earlier he had had pleurisy, for which he is checked yearly.

Examination revealed a visual acuity 20/20 in both eyes with correction. The right eye was normal on external examination. On the left side there was mild

puckering of the eyelids due to photophobia. There was conjunctival hyperaemia, moderate pericorneal redness, and a mucopurulent discharge on that side. In the temporo-inferior quadrant, close to the limbus of the cornea, an ulcer with a diameter of 3 mm was observed. The edges of the ulcer were raised, and there was a 1 mm zone of infiltration round it. On the peripheral part of the ulcer, extending over the limbus and beyond in the adjoining conjunctiva, there was a heaped up, amorphous, crummy material in which hard white specks could be seen.

A mild flare and cells were present in the anterior chamber. Both lenses showed incipient cataracts, and

Fig. 1 *Nocardia gypsoides* ulcer after one week of treatment with chloramphenicol. Amorphous material on ulcer and limbus, partly covering the adjacent conjunctiva. Small white specks of gypsum are visible (arrow).

Fig. 2 Gram-positive coccoid, bacillary, and filamentous forms in smear. (Gram, $\times 567$).

on fundusoscopic examination mild arteriosclerotic changes of the vessels were noted.

Material from the ulcer transported in semisolid cysteine broth was cultured both anaerobically and aerobically on various bacteriological media.

The patient was treated with chloramphenicol eyedrops during the day and ointment for the night pending the determination of the causative agent's sensitivity to antibiotics.

Fig. 3 *Nocardia gypsoides* after 5 days of aerobic incubation at 37°C . Wrinkled brownish-grey colonies with calcareous plaques are visible.

The mild toxic iritis was treated with scopolamine eyedrops.

The ulcer healed slowly under this regimen. One week after treatment was begun the edges of the ulcer had flattened a little and the grey infiltrated area around the ulcer had almost disappeared; the diameter of the ulcer had changed little, however (Fig. 1). Three and a half weeks after treatment the ulcer had closed. A little amorphous, crummy material was still visible on the conjunctiva, but after another week of treatment it had disappeared.

BACTERIOLOGY

Massive growth was obtained from the corneal swab on the aerobic culture media. Three days after inoculation small, dull, domed colonies with an off-white colour were visible. Smears revealed Gram-positive coccoid and bacillary forms and some filaments (Fig. 2). Five days after inoculation the colonies had a wrinkled brownish-grey aspect, and many hard white calcareous plaques, representing calcium sulphate, were visible in the colonies (Fig. 3). The organism was identified as *Nocardia gypsoides*.⁷ It was found to be sensitive to a variety of antibiotics such as penicillin, cloxacillin, lincomycin, gentamicin, cephalosporin, erythromycin, and chloramphenicol.

Discussion

Because nocardia are prokaryocytes and are sensitive to antibiotics they are classified as bacteria. In the past, organisms associated with chronic canaliculitis and mucopurulent discharge, showing coccoid, bacillary, and filamentous forms in the smear were labelled as '*Streptothrix*'. Most of these infections were caused by *Actinomyces israeli*,¹ but at least in one case *Nocardia asteroides* was responsible.⁸ Likewise organisms associated with granulomatous conjunctivitis and suppurative preauricular lymphadenitis were classified as '*Leptothrix*', which then settled the identification. This organism most likely represents the fastidious microaerophilic species *Nocardia tenuis*.⁹

Leptothrix is the generic name of a nonpathogenic Gram-negative, nonbranching, ensheathed, marine bacterium, totally unrelated to Actinomycetales. To complicate matters, the names of both '*Streptothrix*' and '*Leptothrix*' have been applied to anaerobic and aerobic as well as microaerophilic species of the Actinomycetales. Therefore it is useful to abandon '*Streptothrix*' and '*Leptothrix*' as nomina dubia and make every effort to identify members of the Actinomycetales to species level.

Because of the ubiquitous distribution of nocardia it is possible to predict that the incidence of ocular infections is higher than would seem from published

reports. In fact increasing use of immunosuppressive agents may lead to an appreciable increase in nocardial infections.^{10 11} True, isolation of the Actinomycetales can be difficult, as *Actinomyces* grow anaerobically, and even some species of *Nocardia*, such as those associated with Parinaud's oculoglandular syndrome, have optimal growth under microaerophilic conditions.¹² Therefore suitable transport media for eye swabs that support both the aerobic and microaerophilic species of *Nocardia* as well as the anaerobic *Actinomyces* should be used.

Identification of *Nocardia* species is no easy matter and should be left to microbiologists, since in fact it is not possible sharply to characterise *Nocardia* species by morphological and routine biochemical criteria. Definite identification is based on cell wall type and whole cell sugar patterns.

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