
CANALICULAR INFECTION CAUSED BY *ACTINOMYCES*

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SUMMARY

We present 7 cases of canalicular involvement with *Actinomyces* collected over a 5-year period. All patients had involvement of one canaliculus, upper or lower, with lacrimal drainage patent to syringing. Curettings obtained by incising the involved canaliculi yielded *Actinomyces* species (5 cases) and *Arachnia propionica* (2 cases), typically in association with a mixed bacterial growth. Our results show that these patients often remain undiagnosed for months or even years, and are treated inappropriately for their recurrent symptoms. Despite sensitivity of *Actinomyces* to a broad spectrum of antibiotics, medical therapy alone does not eradicate the disease, and surgical evacuation of all concretions is essential to achieve a cure.

The generic name *Actinomyces* was first used by Harz in 1879¹ to describe organisms seen in lesions of cattle. They occurred as masses that resembled fungal mycelia; these mycelia were arranged in a radial pattern, hence the name *Actinomyces* (ray fungus).

Infections of the eye with this organism have been described in the literature under a variety of names such as streptotrichosis, leptotrichosis and actinomycosis. *Actinomyces* species are now recognised as gram-positive bacilli which can occur singly, in pairs or in chains and are non-acid-fast, non-motile, obligate or facultative anaerobes. Characteristically they are seen as branching filaments on gram staining. They are members of the bacterial flora of both man and animals and normally exist in a commensal relationship with their host, growing particularly on teeth and other surfaces in the oral cavity including the tonsils. Chronic granulomatous infections involving various parts of the body can occur and spread is usually by direct extension, producing sinus tracts and characteristic sulphur granules.

Various forms of ocular infection by *Actinomyces* have been described: conjunctivitis, canaliculitis, lacrimal sac involvement, keratitis and endophthalmitis.²⁻⁷ We report 7 cases of canaliculitis caused by these organisms, and emphasise how easily the diagnosis may be overlooked.

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PATIENTS AND METHODS

Of 7 patients presenting between 1988 and 1992, 2 were male and 5 female (Table I); 4 were affected on the left side and 3 on the right; 4 had lower canalicular and 3 had upper canalicular involvement (Figs. 1,2). In all patients syringing of the lacrimal drainage system on the affected side proved patent before surgery. The diagnosis was confirmed by bacteriological examination of the concretions (Fig. 3). These were obtained by incising the canaliculi onto a probe with a blade, or by directly introducing one blade of a fine scissor and cutting the canaliculus. The organisms were isolated by culturing the specimen anaerobically on 7.5% horse blood columbia agar plates (Oxoid, Basingstoke, UK) for up to 5 days. Enrichment culture in Fastidious Anaerobic Broth (Lab M, Bury, UK) was also carried out.

Identification of *Actinomyces* was by gram film (Fig. 4) and biochemical profile using ATB 32 A (bioMerieux, Basingstoke, UK). The profiles obtained for *Actinomyces israelii*, *Actinomyces meyeri* and *Arachnia propionica* all gave excellent identification. Sensitivity testing was by the disc diffusion method on blood agar plates incubated anaerobically.

RESULTS

Before surgery was performed, 6 of 7 patients were treated with various antibiotics (Table I). The antibiotics used, either topically or systemically, were generally effective against *Actinomyces* even when actinomycosis was not considered in the differential diagnosis. Only in 2 cases at a later date was specific treatment for *Actinomyces* started before surgery. Typically this produced a temporary improvement, after which symptoms recurred.

Actinomyces species were grown from 5 of our cases and *Arachnia propionica* (a related genus within the Actinomycetales) from the remaining 2 cases. All except one of the surgical specimens we obtained yielded other organisms in addition to *Actinomyces* species (Table II).

DISCUSSION

All our patients presented with a history of chronic irritation and discharge or/and epiphora. Only 5 patients had a canalicular swelling on presentation, the other 2 developing it during the course of their disease. The disease

Table I. Patients with *Actinomyces* canaliculitis

Patient no.	Sex/age (yr)	No. of visits ^a	Treatment prior to surgery ^b	Time between 1st visit and op. (months)
1	F/24	2	Ampicillin (oral)	4
2	F/56	6	Chloramphenicol (top.), septrin (oral), tetracycline (oral + top.)	2
3	F/29	3	Chloramphenicol (top.) (listed for incision and curettage of cyst)	8
4	M/63	10	Ampicillin (oral), chloramphenicol (top.), tetracycline (oral + top.)	33
5	F/65	9	Ampicillin (oral), penicillin (top. + oral), chloramphenicol (top.)	6
6	M/41	6	Genticin (top.) (Nicholas), Fucithalamic (top.) (Leo), indomethacin (oral), penicillin (top.)	5
7	F/71	3	Zinc and adrenaline (top.)	96

top., topical. ^aNo. of visits = all clinic/casualty visits before surgery. ^bTreatment given in most cases without considering *Actinomyces* as the diagnosis.

affected only one canaliculus in all our cases, but in the literature simultaneous involvement of both upper and lower canaliculi has been reported.^{3,8,9}

The duration of symptoms before these patients first presented to us averaged 13 months. All had a patent lacrimal drainage system on syringing. Despite the chronicity of symptoms and typical patency of the lacrimal drainage system to syringing,^{5,10,11} the diagnosis of *Actinomyces* canaliculitis was overlooked. We feel that in any patient with epiphora, irritation, and discharge from the

punctum of long duration and patency to syringing, *Actinomyces* should be considered. Patients may or may not present with a canalicular swelling.

Actinomyces are usually difficult to grow from routine conjunctival eye swabs⁵ and therefore they are not ideal specimens. Indeed, although in 4 of our cases a pre-operative swab was taken with a specific request to culture for *Actinomyces*, in only 1 case was a positive identification possible (patient 5). Therefore, as much discharge as possible should be placed in a sterile pot and transported to the

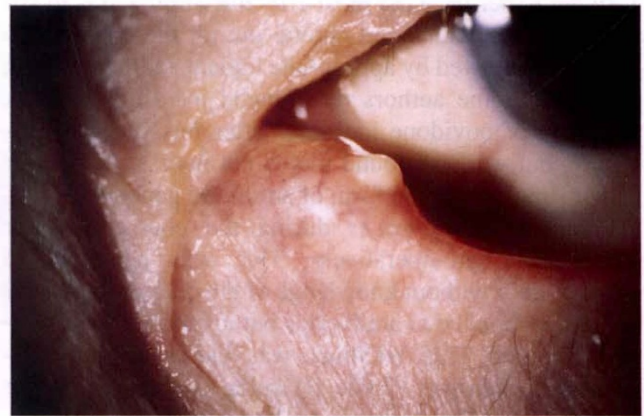
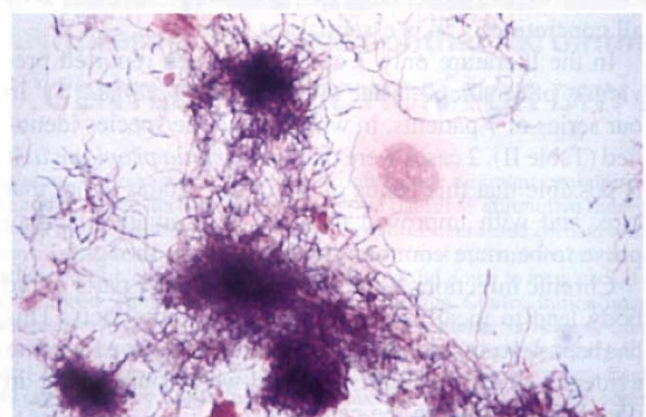
**Fig. 1.** Upper canicular involvement with *Actinomyces*.**Fig. 2.** A pouting punctum and discharge, with patency to syringing, is typical of *Actinomyces* canaliculitis.**Fig. 3.** A canalicular concretion (approx. 9 × 5 mm).**Fig. 4.** Gram staining showing filamentous *Actinomyces*. ×40.

Table II. Microbiological results

Patient no.	Associated bacteria grown with <i>Actinomyces</i>	<i>Actinomyces</i> species	Antibiotic sensitivity
1	<i>Eikenella corrodens</i> , <i>Haemophilus parainfluenzae</i> , <i>Peptostreptococcus</i> sp.	<i>A. israelii</i>	Not known
2	<i>Peptostreptococcus</i> sp., <i>Haemophilus influenzae</i> (β -lactamase producer)	Not known	Not known
3	<i>Peptostreptococcus</i> sp.	<i>A. meyeri</i>	Penicillin, tetracycline, erythromycin
4	<i>Streptococcus milleri</i> , <i>Corynebacterium</i> sp., <i>Peptostreptococcus</i> sp.	<i>A. israelii</i>	Penicillin, tetracycline, erythromycin, chloramphenicol
5	<i>Fusobacterium</i> sp., <i>E. corrodens</i> , <i>Corynebacterium</i> sp., <i>Peptostreptococcus</i> sp.	<i>Arachnia propionica</i>	Penicillin, erythromycin, tetracycline, chloramphenicol
6	<i>Fusobacterium nucleotum</i> , <i>Bacteroides corrodens</i>	<i>Arachnia propionica</i>	Penicillin, erythromycin, tetracycline
7	None	<i>A. israelii</i>	Penicillin, chloramphenicol, erythromycin

microbiology department without delay, to ensure optimal conditions for isolation of *Actinomyces* species.

Various forms of treatment have been recommended for this condition in the past. Medical therapy includes irrigation of the involved canaliculus with penicillin,^{9,10} but this has not been found to be effective. Indeed this was performed in patient 5 with little benefit. Simple mechanical expression of concretions or curetting them after dilatation of punctum can be ineffective in removing all the concretions, as some are fairly large.¹⁰

In our experience the most effective approach is to slit open the canaliculus and curette out all the concretions carefully, followed by appropriate topical and/or systemic antibiotic. Some authors recommend instilling aqueous penicillin or povidone iodine^{3,5,8} after this surgical procedure, but we have found this is not necessary. All our patients received some form of antibiotic generally effective against *Actinomyces* during the course of their management pre-operatively. This was administered either with or without knowledge of the diagnosis. All the patients responded to antibiotics but invariably the symptoms returned. This, we think, was due partly to the co-infecting organisms (Table II) being susceptible to the antibiotics but the *Actinomyces* being only partially susceptible; treatment therefore did not result in eradication of *Actinomyces*, perhaps due to failure of the drug to penetrate concretions. In our experience surgical removal of all concretions^{3,10,11} is essential for a cure.

In the literature only 7 cases have been reported previously of canaliculitis due to *Arachnia propionica*.¹³⁻¹⁸ In our series of 7 patients, in which 6 had the species identified (Table II), 2 cases were due to *Arachnia propionica*. It is possible that this genus of Actinomycetales is not that rare, and with improved methods of speciation it may prove to be more common than previously thought.

Chronic infections by *Actinomyces* in other parts of the body lead to local invasion producing sinus tracts. This has been reported in canicular infection⁹ but we found no evidence of it, although granules were found lying in diverticuli formed in the canaliculi.

It is likely that these organisms gain entry to the canaliculi by either regurgitation from the oral cavity, or

direct inoculation by saliva¹² or some other means, as *Actinomyces* are not found as normal commensals¹⁹ of the lacrimal drainage system.

Key words: *Actinomyces*, Canaliculitis.

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