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Clinical Record

Preseptal cellulitis due to *Mycobacterium marinum*

J Benton, A Karkanevatos

Abstract

Mycobacterium marinum is an atypical mycobacterium found in both salt and fresh water. It occasionally causes soft tissue infections after minor trauma, principally affecting the limbs.

A 17-year-old male aquarium worker presented with preseptal cellulitis of his right eye, after attempting to lance a hordeolum some days previously. The condition failed to respond to antibiotics and a necrotic area developed, which subsequently required debridement. Histology of the debrided area demonstrated granulomatous inflammation which when considered with his occupation led to the diagnosis of *Mycobacterium marinum* – 'fish-tank granuloma'.

A Medline search did not demonstrate any previous cases of *Mycobacterium marinum* infection occurring peri-orbitally. The current literature regarding diagnosis and management is reviewed. Although infection with *Mycobacterium marinum* is rare in the general population, this case demonstrates the importance of considering the diagnosis when dealing with patients frequently exposed to fresh or salt water.

Key words: Mycobacterium Marinum; Orbital Diseases

Introduction

Mycobacterium marinum is an atypical acid-fast mycobacterium found in salt and fresh water; infections may be acquired from unchlorinated swimming pools. Infection usually occurs when skin which has experienced trauma is exposed to contaminated water. It is not thought that one infected human could infect another human directly. Although the skin is the most common location of infection, the joints may also be involved leading to a septic arthritis. The differential diagnosis includes rheumatoid arthritis, lupus arthritis, gout, sarcoidosis, infection with atypical mycobacteria, cat-scratch fever, skin tumours and foreign-body reactions.[1]

Case report

A 17-year-old previously fit and well male student was referred by his general practitioner (GP) to accident and emergency with a tender erythematous swelling of his right upper and lower eyelids. He was employed part time at a shop selling tropical fish. The patient described a hordeolum of his right lower eyelid two weeks earlier, which he had attempted to puncture with a needle. He had seen his GP a week prior to attending accident and emergency and been prescribed a course of fusidic acid cream, however despite this, the swelling had continued to enlarge. He was admitted with a provisional diagnosis of preseptal cellulitis; the differential diagnosis was a severely infected chalazion.

Aside from the marked peri-orbital swelling and inflammation, the patient was systemically well and apyrexial. Eye movements, pupillary reflexes, colour vision discrimination and visual acuity were all normal, as were the appearances of the retina and optic disc. There was no proptosis, nor any evidence of sinus disease when flexible nasendoscopy was performed. The patient was started on intravenous cefotaxime to treat the presumed preseptal cellulitis; he was allergic to penicillins. The blood cultures and the eye swab taken on admission failed to grow any organisms. After 24 hours of intravenous antibiotics there had been no improvement in the peri-orbital swelling so it was decided to arrange a computed tomography (CT) scan to identify abscesses or paranasal sinus involvement.

The CT scan demonstrated marked peri-orbital soft tissue swelling around the lateral orbit, with a small fluid collection between the lateral aspect of the right globe and eyelid (Figure 1). The frontal and ethmoidal sinuses were noted to be clear, and there was only minimal mucosal disease in the right maxillary antrum. It was therefore decided to continue with intravenous cefotaxime. Forty-eight hours later, however, the peri-orbital swelling had further enlarged in size, with a 23 mm by 8 mm dark area on the lower lid which appeared necrotic. By this stage the patient was unable to open his right eye. Although the patient remained systemically well, as he had on admission, because of the lack of response to antibiotics the ophthalmologists were concerned to exclude intracranial pathology, such as a cavernous sinus thrombosis. A magnetic resonance imaging (MRI) scan of the orbits was performed, which again demonstrated the absence of significant paranasal sinus or dural venous sinus disease (Figure 2).

The patient was taken to theatre for incision and drainage of the lower eyelid but despite the fluid demonstrated on the CT scan, no collection could be expressed. It was considered by the ophthalmologists that the dark region on the lower lid might represent an area of necrotising fasciitis. When considered with the patient's continuing good systemic health, the indolent progression of the lesion and the lack of specific features on the imaging, however, it was

From the ENT Department, Leighton Hospital, Crewe, UK.
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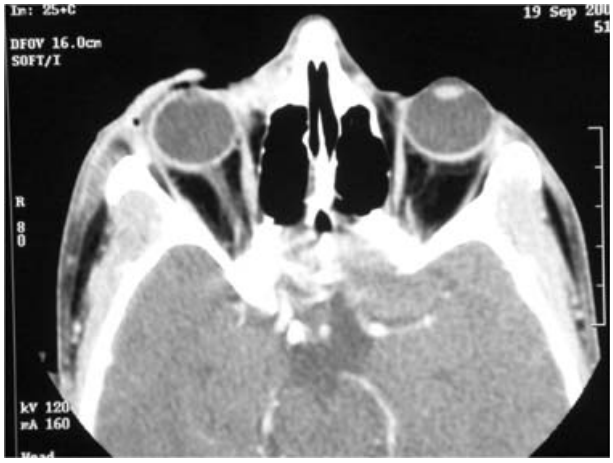

FIG. 1
CT scan of orbits taken the day after admission.

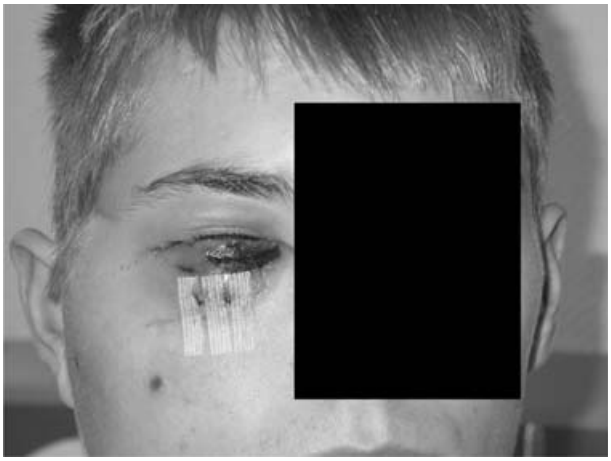

FIG. 3
Patient's eye post-admission day six, following attempted incision and drainage.

decided initially to continue with antibiotics and close observation (Figure 3). The advice of the microbiologists was sought as none of the cultures or swabs taken at any stage had demonstrated any growth, and it was recommended that the patient be prescribed clindamycin in addition to cefuroxime.

Over the next four days, the eye opened more easily and it was considered that the condition was responding, albeit slowly, to the antibiotics. The intra-operative swabs taken demonstrated no growth, however, and the necrotic area on the lower lid had shown no regression. On day 11 post-admission it was decided to perform a biopsy of the necrotic area and send samples for microbiological and histological assessment. The reports described a granulomatous inflammatory process, but Ziehl–Neelsen staining did not demonstrate any acid-fast bacilli.

It was decided to transfer the patient to a specialist oculoplastic hospital where an extensive debridement of necrotic tissues was performed leaving the patient with an absent lower eyelid. The histological report on the debrided tissue decribed widespread florid necrotising inflammation, with prominent necrotising granulomata and tissue infarction present. The Ziehl–Neelsen stain was repeated and again found to be negative; the Wade–Fite stain was negative for *Mycobacterium leprae*. There was no evidence of fungi, parasites or larvae and no definite vasculitis. A sample of tissue was sent to the National Microbiology Reference Laboratory, but they too were unable to definitively identify a causative organism. Given the history of employment in a tropical fish shop, *Mycobacterium marinum* was considered to be the probable culprit. The patient was commenced on a combination of clarithromycin, isoniazid, rifampicin and ethambutol and the infection slowly began to improve. Six months on from his initial admission the infection has entirely resolved. Prior to reconstructive surgery, there was a 3 mm lagopthalmos but a good Bell's phenomenon; he required a pad at night to help with lid closure. A lower lid/cheek subcutaneous soft tissue expander has been placed with a remote port behind his ear. This is gradually being expanded in order to recruit skin from the cheek and residual lower lid, being drawn up over an upper lid tarsoconjunctival flap used in conjunction with medial and lateral periosteal flaps.

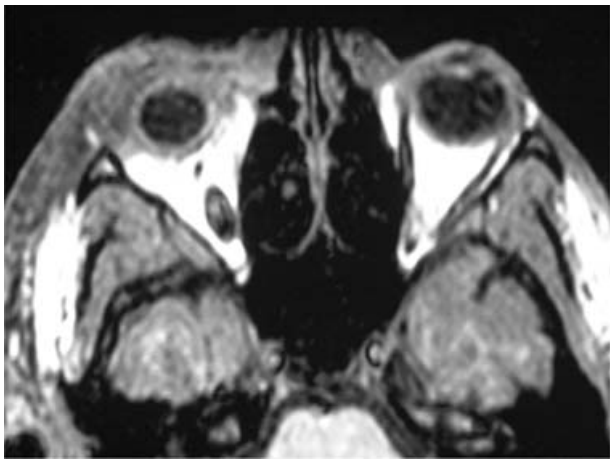

FIG. 2
MRI of orbits taken post-admission day four.

Literature review and discussion

There are no case reports of *Mycobacterium marinum* affecting this site in the medical literature. Most of the cases of *M. marinum* in the literature are soft tissue infections following minor trauma to the upper limbs while in the vicinity of fish tanks;[1,2] indeed the lesions it produces have been dubbed 'fish-tank granuloma'. Osteomyelitis and tenosynovitis have also been reported. Infections are rare with a reported rate of 0.27 confirmed cases per 100 000 patients in the US each year.[3] Significant morbidity is usually rare because of the indolent nature of the infection, except in immunocompromised patients. This particular case differed only because of the proximity of the infection site to the eye.

Cultures in suspected cases of *M. marinum* are commonly negative even after being repeated several times and incubated for long periods with specific growth media. The organism is sensitive to rifampicin, ethambutol, tetracyclines, clarithromycin and levofloxacin; it is recommended to continue with drug therapy for four to six weeks after the resolution of lesions.[4] The prognosis is excellent, except in disseminated disease in the immunocompromised.[5]

Greater awareness is needed amongst aquarium workers and fish tank owners about the risks of infection with *Mycobacterium marinum*. In a recent study in France,[6]

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only 15 per cent of tropical fish shop owners surveyed had heard about the risk of infection and few bothered with precautions such as gloves when handling tanks. Although in the majority of cases the lesions caused are mild, long-term antimicrobial therapy is required. In the case of soft tissue injury occurring in aquarium or fish tank workers, the skin should be cleaned with an antibacterial preparation and covered.

- ***Mycobacterium marinum* may be found in both salt and fresh water; it generally causes slow developing granuloma lesions, usually on the upper extremities**
- **Diagnosis is difficult because of the prolonged incubation of tissue biopsies which may be required; granuloma are frequently not identified even after this**
- **This case report demonstrates the importance of starting the correct antibiotics promptly if there is a suspicion of *Mycobacterium marinum* infection – a more extensive debridement was eventually required**
- **This report demonstrates that otorhinolaryngologists must be aware of the risk of such infections occurring in their patients after minor trauma to the head and neck in an aquatic environment**

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Address for correspondence:
Mr J Benton,
45 Vale Road, Liverpool,
L25 7RN, UK.

Fax: 01515295263
E-mail: jamesibenton@hotmail.com

Mr J Benton takes responsibility for the integrity of the content of the paper.
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