

## *Mycobacterium marinum* Skin Infections: Two Case Reports

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Most infections of soft tissue injury sites are caused by *Staphylococcus* or *Streptococcus* and respond to  $\beta$ -lactam antibiotics. Occasionally, a patient does not respond to routine antibiotics, and other possibilities must be considered. A detailed history of the event that caused the

soft tissue injury can be important in the diagnosis. Two cases of *Mycobacterium marinum* soft tissue infection (ie, fish tank granuloma) are presented.

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*Mycobacterium marinum* is an aquatically acquired pathogen responsible for a cutaneous infection commonly referred to as *fish tank granuloma* or *swimming pool granuloma*.<sup>1,2</sup> If mismanaged, this superficial skin infection can result in significant morbidity including loss of joint mobility secondary to osteomyelitis and even amputation of the affected appendage, thus making it important for family physicians to recognize and treat this infection.<sup>3-5</sup>

### Case Reports

#### Case 1

A 46-year-old man injured his finger while handling a sick catfish in his tropical fish tank. Within 3 weeks his finger was swollen and painful. His family physician placed him on oral ciprofloxacin. Despite 4 months of treatment and examination by numerous other physicians, the infection persisted. Finally, the lesion was incised and drained. Biopsy revealed granulomatous inflammation and routine cultures grew *Corynebacterium*. Treatment with ciprofloxacin was continued for an additional 8 weeks, after which time the finger appeared to have healed.

Three weeks after the patient stopped taking the antibiotic, the finger again became swollen and erythematous, and the patient was sent to another physician

(P.G.) for an infectious disease consultation. A clinical diagnosis of fish tank granuloma was made, and the patient was begun on oral, double-strength trimethoprim/sulfamethoxazole twice daily. Incision and drainage was again performed, and acid-fast bacilli (AFB) stain was found to be negative on the drainage and tissue. *Mycobacterium marinum* was identified 4 weeks later, however, by the Michigan Department of Public Health following direct inoculation of tissue onto Lowenstein-Jensen medium at 32°C.

The patient initially did well on a 2-week course of trimethoprim/sulfamethoxazole. However, he subsequently developed renal insufficiency and was therefore switched to rifampin and ethambutol. He was treated with these medications for an additional month and thus far has had no further recurrence of the infection.

#### Case 2

A 46-year-old woman related that she accidentally stabbed her right thumb with a fork while cleaning a fresh-water fish tank. One week later, erythema, swelling, and lymphangitis developed. Her family physician started her empirically on cephalexin, and later switched her to cloxacillin, which resulted in a slight improvement in the lymphangitis. After 1 month without further significant improvement, an infectious disease specialist (P.G.) was consulted. The lesion was incised and drained and oral doxycycline (100 mg twice daily) was prescribed. Laboratory test results showed that a complete blood count, sedimentation rate, and C-reactive protein were all within normal limits. Gram stains of surgical specimens were negative. The biopsy showed granuloma-

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Figure 1. Aquarium-acquired, cutaneous infection of third digit by *Mycobacterium marinum* (Case 1).

matous inflammation with histiocytes and lymphocytes, but no fungal elements. *Mycobacterium marinum* was identified 6 weeks later by the Michigan Department of Public Health from a specimen that had been inoculated onto Lowenstein-Jensen medium at 32°C. The patient improved rapidly on a 3-month course of rifampin and ethambutol.

## Discussion

*Mycobacterium marinum* is a photochromogen classified as a *Mycobacterium* organism other than *Mycobacterium tuberculosis* (MOTT), and is known to cause human skin infection.<sup>6</sup> This aquatic organism can usually be cultured at 22° to 33°C on Lowenstein-Jensen medium, but in general will not grow well at 37°C.<sup>2</sup> A careful patient history will reveal exposure to contaminated fish or an injury that occurred in contaminated waters such as in an aquarium, swimming pool, ocean, lake, or river.<sup>2</sup> Patients usually present with reddish papules, nodules, or pustules on the affected area, which manifest over a period of 3 weeks following initial trauma (Figure 1). Most common locations for lesions include elbows, knees, dorsa of hands, feet, nose, and fingers.<sup>6,7</sup> Lesions may become verrucous or ulcerated over time, and tenderness, discharge, lymphadenitis, pruritis, and a decreased range of motion of the affected joint may develop. If an abscess develops at the initial site of trauma, the cutaneous lesion may resemble sporotrichosis, man-

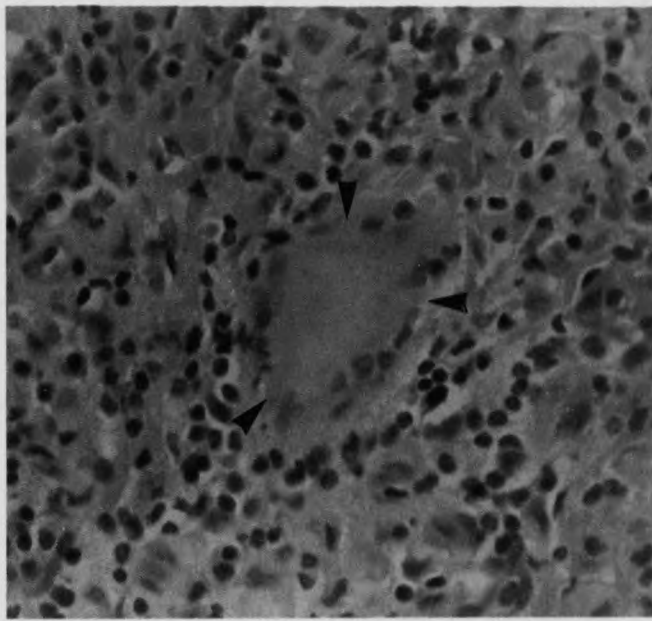


Figure 2. Photomicrograph from an aquarium-acquired *Mycobacterium marinum* skin infection (Case 1). Arrows indicate granuloma.

ifested by several secondary nodules arising along the lymphatics.<sup>1,6</sup>

The differential diagnosis of cutaneous *M marinum* infection includes granulomatous processes caused by other mycobacterial infections such as tuberculosis verrucosa cutis, as well as verruca vulgaris and certain cutaneous neoplasms. Blastomycosis, coccidioidomycosis, histoplasmosis, sporotrichosis, nocardiosis, tertiary syphilis, yaws, and cutaneous leishmaniasis also need to be considered.<sup>8</sup>

Direct AFB stains of tissue or drainage should be obtained, although results are usually negative.<sup>2</sup> Biopsy of early lesions (<2 months) show nonspecific inflammation, while older lesions (Figure 2) show granulomatous formation.<sup>2,9</sup> A minimum of 2 weeks is necessary for a positive *Mycobacterium* culture to grow at 27° to 33°C and for antibiotic sensitivities to be determined. Controversy exists as to whether surgical excision or even incision and drainage should be performed, as either may lead to the spread of infection into deeper tissues.<sup>1</sup>

Treatment of cutaneous *M marinum* infection consists of oral rifampin (600 mg daily) plus ethambutol (15 mg/kg/d), trimethaprim/sulfamethoxazole, minocycline, or doxycycline for at least 6 weeks.<sup>10-12</sup> Amikacin and kanamycin are also effective.<sup>13</sup> Alternative treatments include erythromycin, ciprofloxacin, or cycloserine.<sup>11</sup> Treatment with steroids will worsen the infection.<sup>14</sup> The organism is usually resistant to isoniazid and streptomycin. Treatment with rifampin alone is not recommended,

as the likelihood of developing resistance to this single agent is high.<sup>10</sup>

Single cutaneous lesions usually resolve spontaneously in 3 weeks to 3 years, while the sporotrichoid form may persist longer.<sup>6</sup> However, deeply invasive *M marinum* infections of tendons, joints, and bones can result in significant morbidity including loss of joint mobility and may even require amputation.<sup>3-5,15,16</sup> It is thus important for physicians to be able to diagnose and treat this mycobacterial infection.

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