

## Case Report

# ***Mycobacterium marinum* infection: A case report**

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**Abstract** Atypical mycobacterial infections are not uncommon in our society and are usually acquired from environmental sources like water and soil. Among them, *Mycobacterium marinum* infection, also called swimming pool granuloma, is characterized by a violaceous papule, nodule or plaque which appears at the site of trauma about 2 to 3 weeks after inoculation. More than one lesion may be present in a sporotrichoid pattern which ulcerate to form discharging sinuses leading to scarring. Many cases with similar and additional features have been reported in foreign literature. We describe one case of this infection along with review of literature.

### **Key words**

Atypical mycobacteria, *Mycobacterium marinum*, granuloma, sporotrichoid

## **Introduction**

*Mycobacterium marinum* formerly called *M. balnei* is a free-living bacterium which causes opportunistic infections in humans.<sup>1</sup> Although, Aronson isolated this organism in 1926 from a fish, it was not until 1951 that it was found to be the cause of human disease by Linell and Norden.<sup>2,3</sup> It is one of the atypical mycobacteria which are acid-fast, facultative pathogens or saprophytes.<sup>4,5</sup> Risk factors for *M. marinum* infection are a history of trauma and water-or fish/seafood-related hobbies and occupations.<sup>5</sup>

The disease begins as a violaceous papule or nodule.<sup>1,5</sup> It can also present as a psoriasiform or verrucous plaque, usually on the hands, feet, elbows or knees, at the site of trauma, about 2 to 3 weeks after inoculation.<sup>1,5,6</sup> These may be solitary but are often multiple and occasionally sporotrichoid spread occurs.<sup>5,6</sup> The lesions may ulcerate or frequently heal spontaneously within

1 to 2 years, with residual scarring.<sup>7</sup> Sometimes, penetration to underlying structures (bursae, joints) may occur.<sup>6,8</sup> Regional lymph nodes are, as a rule, not involved.<sup>8</sup> Occasionally, the lesions are suppurative rather than granulomatous which may be multiple in immunosuppressed hosts.<sup>1,4,6</sup>

Diagnosis is frequently delayed, probably due to rarity of the infection and a failure to elicit the usual history of aquatic exposure. Sometimes, culture of *M. marinum* is negative but the diagnosis is still made on physical signs supported by typical histological findings. Various DNA-based techniques have been used to classify mycobacteria.<sup>1,4,5</sup> A prolonged course of antibiotic therapy is curative in most superficial cases but adjunctive surgical intervention is sometimes indicated in extensive and deep infections.<sup>7,9,10</sup> We report a case of this infection along with review of literature.

## **Case report**

A 45-year-old male, salesman, resident of

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Lahore, presented at the Department of Dermatology Unit-I, King Edward Medical University/Mayo Hospital, Lahore with complaints of multiple draining sinuses on chest and arms for last one year. Initially, the lesions started with papules which progressed to nodules and pustules leading to draining sinuses. He also had a history of high grade fever (100-102°F) with evening rise, associated with rigors and chills. There was no history of trauma, cough, anorexia and weight loss or similar disease in family. There was also no history of contact with a tuberculous patient but he gave a history of swimming in a local water park one month prior to the onset of disease. He took treatment from various general practitioners but there was no response to any therapy even with anti-tuberculous drugs for 6 months.

Physical examination revealed a middle-aged man with normal built. Lymph nodes examination showed a palpable right anterior axillary lymph node, 1cm in size with a rubbery consistency. Cutaneous examination revealed multiple nodules and sinuses on both arms, forearms and chest with purulent exudates as shown in (**Figure 1**). Multiple depressed atrophic scars were also present on the right arm and anterior aspect of right shoulder with striae distense (**Figure 2**) while he had few post-inflammatory hyper- and hypopigmented healed scars on the back of right shoulder. Systemic examination revealed no abnormal finding.

On laboratory investigations, the blood, urine and stool were all within normal limits. Gram staining and smear for Leishman-Donovan (LD) bodies was negative. The bacteriological examination of pus showed no AFB or other micro-organisms. Hepatitis B surface antigen and HIV screening were negative while anti-HCV was found to be positive. Mycodot test



**Figure 1** Multiple nodules and sinuses on both arms, forearms and chest.



**Figure 3** Healed lesions showing depressed scars and striae distense.

revealed negative IgG and IgM result. Microscopy for fungal spores was also negative.

X-ray chest and CT scan were normal and abdominal ultrasonography revealed hepatomegaly with fatty liver. Histopathology of skin revealed acanthosis of the epidermis with dermal lymphocytic infiltrate and few Langhan's giant cells while fine needle aspiration cytology showed a tuberculous picture. As in all mycobacterial diseases, the diagnosis required a high index of suspicion. An appropriate history (handling of fish, use of swimming pools) and the presence of a tuberculoid granuloma on histopathological examination were suggestive. Polymerase chain amplification showed a positive result with atypical mycobacteria while DNA sequencing confirmed *M. marinum*.

Currently, the patient is under observation with continued treatment on rifampicin, amikacin and clarithromycin for the last 3 months with some improvement.

## Discussion

*M. marinum* is the most common atypical mycobacterium to cause human disease.<sup>1,8</sup> The first case of this infection, associated with fish tank granuloma, was reported by Swift and Cohen in 1962.<sup>1</sup> *M. marinum* occurs in fresh and salt water, including swimming pools and fish tanks and outbreaks of this infection have been described in association with swimming.<sup>1,4,5,8</sup> The infection is more common in immunocompromised hosts.<sup>6</sup> The condition has to be differentiated from some other clinical entities like cutaneous tuberculosis or other atypical mycobacterial infections, cat scratch disease, leishmaniasis, sporotrichosis, blastomycosis, coccidioidomycosis, histoplasmosis, nocardiosis, tertiary syphilis and yaws.<sup>5,6,10</sup>

In our case, ulcerated lesions with draining sinuses, histopathology report, poor response to ATT, positive culture with atypical mycobacteria and a positive result on PCR testing favoured the diagnosis of *M. marinum* infection.<sup>4,5,11,12</sup> The cutaneous tuberculosis can also be contracted from swimming pools.<sup>4</sup> Scrofuloderma, clinically mimics this infection but it was ruled out due to the absent typical histopathology and negative PCR report for *M. tuberculosis*. Infections with *M. kansasii* may also spread in a sporotrichoid pattern but it is usually associated with lung involvement and cervical lymphadenopathy which were absent in our patient.<sup>5</sup> The absence of significant regional adenitis helped to distinguish it from cat scratch disease and primary inoculation tuberculosis.<sup>4</sup> Where leishmaniasis and sporotrichosis are endemic, they must be excluded.<sup>4</sup> The clinical features of both conditions are similar to *M. marinum* infection but negative report of smear for LD bodies and fungal hyphae and histopathology report led to exclusion of these conditions.<sup>11</sup> Scars on the limbs posed a difficulty in differentiating it from deep mycosis, but the negative result for fungus on microscopy and culture along with histopathological examination differentiated this entity from *M. marinum* infection. Blastomycosis, coccidioidomycosis and histoplasmosis, were ruled out by a typical history, negative fungal microscopy, characteristic histology and absence of any systemic illness in our patient.<sup>11</sup> In nocardiosis, papulo-nodular eruptions occur on the limbs and trunk leading to draining sinuses and the organisms are detected as gram-positive branched-filaments and branching at right angle is confirmatory.<sup>13</sup> In tertiary syphilis, characteristic features are nodular or ulcerated lesions but no neurological or cardiovascular involvement and negative report of serological

test for syphilis are the key points to differentiate this condition from *M. marinum* infection while in yaws, the laboratory tests would help to rule out this condition.<sup>14</sup>

The key elements in the diagnosis of this infection are a high index of suspicion, taking a history with an emphasis on exposure to tropical fish or other potential sources of *M. marinum* infection and tissue biopsy for culture and histopathology.<sup>4-6</sup> Like most atypical mycobacteria, *M. marinum* is poorly susceptible to antituberculous drugs. Treatment is limited to broad spectrum antibiotics but spontaneous healing may occur.<sup>1,4-7</sup>

## Conclusion

Atypical mycobacterial infections are not uncommon in our society and these should be ruled out in all cases not responding to conventional antituberculous treatment.

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