

# Rare skin manifestation of *Mycobacterium marinum*, lesion on shoulder: a case report

## Abstract

*Mycobacterium marinum* causes sporadic skin infection. It mostly appears on extremities with erythematous or bluish papule or nodule at the inoculation site, usually after skin abrasions are exposed to contaminated water or fish. A 43-year-old male patient with no prior medical history noticed the appearance of red lesions on the back of his left shoulder 2 years earlier. Various physicians visited the patient and misdiagnosed as contact dermatitis. Physical examination revealed polycyclic livid plaques with irregular hyperkeratosis on the back of his left shoulder. Eventually it was reported he carried a fishing net on his shoulder near the time lesions appeared. So, with suspicion of *Mycobacterium marinum*, skin biopsies were performed and histopathology showed epidermis with acanthosis and parakeratosis. The dermis showed severe infiltration of neutrophils and lymphoplasmic cells with the presence of few giant cells and poorly defined granulomas indicating acute or chronic necrotizing granulomas. Within three weeks of starting treatment with oral clarithromycin, rifampin and co-trimoxazole, signs of improvement began. The manifestation of this disease and its site of involvement in this patient was very rare among previous case reports, so it was considered necessary to be reported.

**Keywords:** *Mycobacterium marinum*, chronic granulomatous disease, atypical, fish farms, plaques, erythematous nodule

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## Introduction

Atypical bacterial skin infections are clinically important and challenging. The importance of careful investigation of lesions, physical examination, and detailed history is undeniable. In the cases of atypical infections and lesions, thorough review of the occupational background, travel history, exposure to potential pathogens and microorganisms, and routine activities are crucial.

*Mycobacterium marinum* is a slow-growing and non-tuberculous mycobacterium that was first identified in Philadelphia in 1926 and causes aquarium granuloma or fish tank granuloma in humans.<sup>1</sup> It is present in fresh and salt water.<sup>2</sup> This organism is especially found in natural swimming pools and warm aquariums.<sup>3</sup> The infection causes tuberculous-like illness in fish and can infect humans when the skin is injured and exposed to the organism. It spreads through the distribution of the lymphatic system and can infect both immunocompetent and immunocompromised individuals.<sup>4</sup>

The clinical manifestations of *M. marinum* include granulomatous skin and soft tissue lesions, especially in acral distribution with non-specific and erythematous nodules, papules, and plaques, which makes the diagnosis with other granulomatous lesions more difficult.<sup>5</sup>

Laboratory and pathology evaluations are essential to make a definite diagnosis. The standard test to diagnose *M. marinum* is culture from a tissue biopsy. The mainstay of management in *M. marinum* infection is antimicrobial therapy, and combination therapy with at least two agents is preferred. Rifampin is one of the most effective drugs against *M. marinum* infection.<sup>3</sup>

This study's purpose was to understand better the different aspects of atypical skin lesions and its clinical perspectives. In this case, we present a rare case of *M. marinum* in a 43-year-old man with a different location of skin involvement that was very rare.

## Case presentation

A 43-year-old Caucasian male patient with no prior medical conditions or surgery, who worked as a building painter, noticed the

appearance of red lesions on the back of the left shoulder 2 years earlier. The lesions did not bother the patient, and a variety of physician specialists visited the patient at that time. The dermatological lesions and granulomas were misdiagnosed as possible paint hypersensitivity or contact dermatitis (according to the patient's occupation) and different types of antihistamines and anti-inflammatory and topical corticosteroids and even systemic corticosteroids were prescribed for the patient. With no evidence of improvement, the patient changed his job so he would no longer be in contact with paints, but still, there was no change in the patient's condition.

Physical examination revealed multiple vesicles, bulla, and pustule which secrete clear and purulent secretions, on the back of his left shoulder and the lesions were slightly itchy, fixed and immobile. He had no comorbidities and had no chronic drug use. Considering these symptoms and the fact that the patient had changed jobs, contact dermatitis was no longer considered as one of the primary diagnoses. He had no history of tuberculosis or any other systemic illness. Based on the physical examination, we included *Mycobacterium marinum* as one of the differential diagnoses (even though the manifestation of this disease is very rare in these areas and occurs mostly in the hands and fingers); we asked about the patient's history of contact with fish (Figure 1).

He reported in a detailed medical history that the patient's friend had a fish breeding pond. A few weeks before the lesions appeared, he went to the fish pond several times and entered the pond while carrying fishing net on his shoulder. After catching the fish, he put the fish in a bag and carried the bag on his shoulder for a distance.

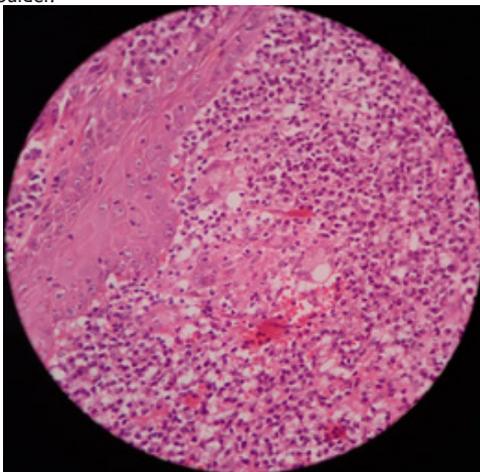
We suspected that the site of the fishing net and fish-carrying bag on the back of the patient's shoulder was similar to *Mycobacterium marinum* inoculation. Skin biopsies were taken for histopathological examination, and it showed the epidermis with acanthosis and parakeratosis. The dermis showed severe infiltration of neutrophils and lymphoplasmic cells with the presence of few giant cells and poorly defined granulomas indicating an acute or chronic necrotizing granulomatous inflammatory process due to an atypical mycobacterial

infection, so *M. marinum* diagnosis was confirmed via histological examination. (Ziehl–Neelsen and Periodic acid–Schiff (PAS) staining were negative).

The patient managed well with appropriate treatment. Within three weeks of starting treatment, signs of improvement began, prescribed with oral clarithromycin 500 mg orally, b.i.d, rifampin at a dose of 600 mg daily in combination, and co-trimoxazole 960 mg b.i.d., to be continued for at least three months (Figure 2).



**Figure 1** Erythematous-livid plaque and amethystine papule on the back of the left shoulder.



**Figure 2** Severe infiltration of neutrophils and lymphoplasm cells with the presence of some giant cells and poorly defined granulomas (Hematoxylin and eosin; original magnification 400x).

## Discussion

*M. marinum* is a free-living, non-sporing gram-positive, acid-fast bacillus that can survive in various environments and was first isolated from fish. *M. marinum* is a slow-growing photochromogen (Runyon group 1) that produces a yellow pigment when exposed to light in appropriate medium cultures like the Lowenstein-Jensen medium and grows optimally between 30 and 33°C. It causes disease in saltwater fish and freshwater and sporadically in humans. Dead fish is known to be a reservoir.<sup>6-8</sup>

The diagnosis of this sporadic skin infection is primarily clinical. Detailed history taking, occupational, travel, and leisure exposure are

necessary. *M. marinum* has many different clinical presentations. It mostly appears on extremities with erythematous or bluish papule or nodule at the inoculation site and may ulcerate later. In 90 percent of cases, the inoculation site is the upper extremity,<sup>9,10</sup> but our case site of infection involvement was in a rare site, in the back of the shoulder, which was not seen before in *M. marinum* previous case reports. In an earlier study of 63 patients with *M. marinum* infection, all lesion sites were in the hand, arm and forearm, wrist and legs, and back of the shoulders were involved in none of them.<sup>11</sup> In another study which presented 28 cases of this infection, it was noted that inoculation sites were similar in hands, fingers, wrists, and arms.<sup>12</sup>

Some patients may suffer from more severe and rare complications like bursitis, tenosynovitis, osteomyelitis, and septic arthritis. Bacteremia is rare and may be seen in immunocompromised patients.<sup>9,13</sup> In another previous case report, severe osteomyelitis associated with *M. marinum* was reported. A 64-year-old man with worsening left arm swelling and tenderness was first misdiagnosed with rheumatologic disorders, and later his smear and culture were positive for *M. marinum*.<sup>10</sup> However, our patient in this study did not suffer from any of these complications.

Skin lesions of *M. marinum* may be misdiagnosed with other similar diseases that mimic *M. marinum* lesions. For instance, in our case, several physicians and specialists diagnosed contact dermatitis for this patient mainly because his job is facing him by building painting chemicals; some essential differential diagnoses of this infection that should be considered include chromoblastomycosis, tinea infections, botryomycosis, sporotrichosis, deep fungal infections, leishmaniasis, and sarcoidosis. If joints are involved, it may be misdiagnosed as inflammatory arthritis and rheumatologic disorders, and inappropriately injected steroids would worsen the prognosis.

*M. marinum* typically develops after minor injury or contact with fish.<sup>14</sup> In our case, also, *M. marinum* infection inoculates c by minor damage, which Carrying fishing nets and fish carrying bags on his shoulder caused it. Histopathologic findings from biopsied sites demonstrate non-specific infiltrates and granulomas. Tuberculoid, sarcoid, and nodule-like granulomas have been reported. Moreover, Histopathologic findings of *M. marinum* consist of granulomatous inflammatory processes, acanthosis, and parakeratosis in the dermis. These granulomas may be presented with central necrosis and suppuration.<sup>15</sup> In the present case report, a biopsy was performed Which revealed an epidermis with acanthosis and parakeratosis, and the dermis shows severe infiltration of neutrophils and lymph plasma cells with the presence of some giant cells and poorly defined granulomas (Hematoxylin and eosin staining) and Ziehl–Neelsen staining and Periodic acid–Schiff (PAS) staining were negative.

After the patient is diagnosed with *M. marinum* infection, the appropriate treatment should be initiated. There is no proven and standard therapy for this infection because of few evidence, and also it is a multi-drug resistant microorganism, so treatment is based empirically. In superficial infections, clarithromycin, ciprofloxacin, doxycycline, or trimethoprim-sulfamethoxazole as monotherapy were seen to be compelling. However, in some cases, combination therapy is preferred due to resistance and recurrence. Generally, *M. marinum* is susceptible to commonly used antibiotics like quinolones and macrolides. Failure to completely eradicate the infection is mainly due to deeper structural and organ involvement, non-adherence to therapy, or inappropriate therapies.<sup>9,16,17</sup> Our prescription was oral clarithromycin 500 mg orally, b.i.d, rifampin at a dose of 600 mg daily in combination, and 960 mg b.i.d Co-trimoxazole, to be continued for at least three months.

## Conclusion

Infection with *M. marinum* is rare and has no pathognomonic clinical features. Awareness of different aspects of presentation and a detailed medical history are critical factors in making a diagnosis. The present report described a case of *M. marinum* infection in a patient with lesions on the back of his left shoulder. The patient had several medical consultations with a misdiagnosis of contact dermatitis. He eventually reported he carried a fishing net on his shoulder near the time lesions appeared. Histopathology indicated an acute or chronic necrotizing granulomatous inflammatory process due to an atypical mycobacterial infection; test confirmed the diagnosis. Treatment with oral clarithromycin, rifampin and co-trimoxazole was effective and the first signs of improvement appeared after three weeks.

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## Conflicts of interest

Authors declare that there is no conflict of interest.

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