

## **A case of extensive cutaneous *Mycobacterium marinum* infection in a Pacific Islander living in New Zealand**

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### **Abstract**

*Mycobacterium marinum* is a rare cause of cutaneous infection. The typical clinical picture consists of one or more discrete well circumscribed lesions affecting the upper limbs. However, a more exuberant form has been described in the South Pacific, where it is sometimes entitled 'Spam disease' given the infected skin's similar appearance to the canned food. We describe a case of this more extensive infection in a South Pacific Islander who appears to have acquired the infection in New Zealand, and remained undiagnosed for many years.

### **Case report**

A 43-year-old Samoan man presented with a 3-month history of progressively worsening skin ulceration of his right leg and arm. This was on a background of an 8-year history of a chronic, unexplained right lower leg skin lesion. He was systemically well.

The skin problem initially developed following a grazing injury on his right knee on metal steps at an abattoir in New Zealand (NZ). He denied any fresh or salt water exposure. Following the injury, a progressively expanding, pruritic, erythematous, keloid skin plaque with pustules gradually developed to involve the right lower limb. Subsequently, the right upper limb was affected with similar abnormalities of 7 months duration but without any initial trauma.

Previous investigations over the 8-year period had included a skin biopsy which revealed chronic and acute non-specific dermatitis, skin scrapings which revealed no fungal elements, and a wound swab which grew *Staphylococcus aureus* (*S. aureus*) and *Streptococcus pyogenes*.

Multiple treatments were trialled over the 8 years including terbinafine, mometasone, clobetasol propionate ointment, flucloxacillin, and erythromycin. There was at best temporary regression of the skin lesion with all therapeutic options trialled.

The patient had no other significant medical history. Of note there was no evidence of immunosuppression. He migrated to NZ from Samoa 10 years before.

On examination, the right leg was affected with erythematous, hypertrophic, scarring papules and dried exudates with an open area of ulceration on the medial aspect of the lower leg (Figure 1).

The right upper arm and forearm were similarly affected (Figure 2). There was no lymphadenopathy and the chest examination was unremarkable.

**Figure 1**



**Figure 2**



Initial investigations revealed a raised C-reactive protein, but normal blood count differential. Wound swabs revealed Gram-positive bacilli on Gram stain and *S. aureus* on culture. The patient was initially treated with intravenous flucloxacillin and clindamycin.

Histological examination of a skin biopsy demonstrated focal ulceration of the epidermis, with an acute inflammatory infiltrate with suppuration, and reticular dermis replaced by granulation tissue with one area of granulomatous response. Ziehl-Neelson stain revealed acid-fast bacilli. The histological appearances were consistent with a mycobacterial infection.

Pending full culture results he was commenced on rifabutin, clarithromycin, ethambutol, imipenem and isoniazid for suspected atypical mycobacterial infection.

*Mycobacterium marinum* (*M. marinum*) was subsequently confirmed on culture. Following this, his anti-mycobacterial regime was rationised to rifabutin, clarithromycin and ethambutol.

He tolerated anti-mycobacterial therapy well. Twelve months later, the patient's skin lesions have healed and the skin is intact with keloid formation.

## Discussion

*M. marinum* generally causes cutaneous infection which classically develops following contact with aquatic animals, or fresh or salt water.<sup>1,2</sup> It is therefore commonly known as swimming pool granuloma, although only 50% of patients have known inoculation.<sup>3,4</sup>

Disruption in skin integrity often precedes infection, allowing a point of entry.<sup>1-3,5</sup> It is known to affect both the younger and older population.<sup>4,5</sup> The upper limb is predominantly affected, which is likely secondary to the increased risk of contact with aquatic animals with the hand.<sup>3,4,7</sup> Typically the initial lesion is a papule, which may subsequently progress to shallow ulceration and scar formation.

It characteristically presents as non-healing skin lesions with or without subcutaneous nodules which are hyperkeratotic in nature.<sup>4,7</sup> In addition, *M. marinum* can occasionally cause arthritis, tenosynovitis and bursitis.

*M. marinum* infection has been recently noted to have an increased prevalence in some parts of the South Pacific. The clinical appearance there is quite distinct from the classical solitary papular nodule described above.

A case report published in 2008 described a 29-year-old man who exhibited an 18-year-history of a progressively expanding verrucous plaque skin lesion on his left lower limb. Investigations revealed *M. marinum* as the causative organism.<sup>5</sup>

Locally the condition is called 'Spam disease' given the infected skin's similar appearance to the canned food.<sup>5,6</sup> Spam disease has been seen in a large number of the residents of Satowan, a small island in the Federated States of Micronesia, likely secondary to the presence of *M. marinum* in introduced fish that proliferated in water-filled bomb craters remaining after World War II.<sup>5</sup>

In 2004, greater than 10% of the Satowan Island's 650 inhabitants were affected by this disease, with a mean duration of infection of 12.5 years.<sup>5</sup> A limited number had received antibiotics or undergone surgical debridement, but the majority of management was topical.<sup>5</sup> 100% of those affected were taro farmers, an occupation which requires standing in deep still water, and presumably results in chronic exposure to *M. marinum*.<sup>5</sup>

*M. marinum* infection may respond to several classes of antibiotics. Patients can be treated with standard anti-tuberculosis agents, but ciprofloxacin, clarithromycin, doxycycline and co-trimoxazole have been used with better effect.<sup>4</sup> There is evidence of resistance to isoniazid, and pyrazinamide.<sup>5</sup> One retrospective study revealed that the majority of patients were treated with one antibiotic alone, either minocycline, doxycycline or clarithromycin.<sup>7</sup> Combination antibiotic regimens all included clarithromycin in this study,<sup>7</sup> and 97% of patients cleared the disease.<sup>7</sup>

Successful treatment of *M. marinum* in patients of Pacific Island descent was noted following the initial combination of rifampicin 600 mg once daily plus co-trimoxazole (800 mg/160 mg) twice daily for a range of 6 to 12 weeks, followed by co-trimoxazole alone for varying lengths of time.<sup>2</sup>

Further success in Pacific Island patients has been seen with doxycycline twice daily with or without the addition of rifampicin.<sup>5,6</sup> Unfortunately these results are based on small case series with limited long-term follow up.

To our knowledge this is the first description of a case of "Spam disease" caused by *M. marinum* in NZ. The source of infection is not known, although it seems most likely that it was acquired in NZ. It is possible that there was unrecognised infection at the time of his emigration from Samoa.

Infection with *M. marinum* can cause chronic, extensive and debilitating skin involvement, especially in those of Pacific Island descent who seem to be at increased risk of this severe form of the disease. It is important to consider this condition in susceptible individuals presenting with atypical skin lesions.

Although exposure to water is a risk factor, not all patients have a history that suggests this. Diagnosis can be made by a combination of skin biopsy for culture, histology and/or polymerase chain reaction.

Doxycycline, co-trimoxazole, or clarithromycin are likely to confer the most therapeutic benefit in Pacific Island patients.

**Competing interests:** Nil.

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