Cutaneous *Mycobacterium marinum* infection secondary to well water exposure masquerading as cutaneous Crohn’s disease

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**INTRODUCTION**

*Mycobacterium marinum* is a nontuberculous, acid-fast organism ubiquitous in freshwater and saltwater environments. Strains infecting humans have been isolated from swimming pools, wells, rivers, and fish tanks. The infection typically presents as granulomatous nodular lymphangitis with sporotrichoid distribution. Immunocompromised individuals, especially those using tumor necrosis factor-alpha inhibitors, are at a greater risk of developing cutaneous manifestations. Here, we report a case of cutaneous *M. marinum* infection initially concerning for cutaneous Crohn’s disease (CD), and highlight the importance of considering both entities in the histopathologic differential.

**CASE REPORT**

A 41-year-old woman with inflammatory polyarthropathy and CD, managed with infliximab 10 mg/kg every 8 weeks, methotrexate 15 mg weekly, and prednisone 5 mg daily, presented with a 6-month history of progressive pruritic and tender erythematous papules and pustules on the upper back (Fig 1, A). The initial external punch biopsy was interpreted as suppurative granulomatous dermatitis consistent with a ruptured follicle or cyst. Given the lack of response to oral antibiotics (a 10-day course of clindamycin and a 7-day course of levofloxacin) and the slow expansion of the plaques, she was referred for a second opinion at our institution. On our initial evaluation, she was suspected to have acne conglobata, and started on a 1-month trial of isotretinoin and prednisone was increased to 40 mg daily with a plan to taper it over 4 weeks. Over these 4 weeks, she developed extensive red papules coalescing into infiltrative plaques with scattered yellow crust across the upper back (Fig 1, B).

A second punch biopsy performed at our facility revealed lichenoid and diffuse granulomatous dermatitis consistent with a ruptured follicle or cyst. Given her clinical history and histopathologic findings, a diagnosis of cutaneous CD was favored. A trial of oral metronidazole 500 mg three times per day was started as therapy for cutaneous CD, prednisone dose was increased to 50 mg daily, and there was a discussion of transitioning from infliximab to upadacitinib.

One month later, her tissue culture was positive for *M. marinum*. Infliximab and methotrexate were held, and she received clarithromycin 500 mg twice daily and ethambutol 1400 mg once daily. An expedited
prednisone taper was attempted; however, her inflammatory polyarthritis symptoms recurred at doses below 30 mg daily. She denied exposure to fish tanks, ponds, or other bodies of water. She noted the use of well water at her home.

**DISCUSSION**

Diagnosing cutaneous *M. marinum* is challenging. Growth of cultures occur slowly, often takes 2 and sometimes up to 8 weeks, and requires specific temperature settings. Additionally, very few atypical presentations, with either localized coalescing papules or diffuse spread, have been reported in the literature. In patients with known CD, recognizing a cutaneous *M. marinum* infection can be especially challenging because of histopathologic similarities. Both disease processes can demonstrate prominent granulomatous dermatitis, lymphoplasmacytic infiltrates, and lichenoid interface dermatitis. Typically, inoculation of the skin occurs through direct contact with infected fish; however, wounds exposed to contaminated water can also serve as a nidus.

Although the patient described in our case denied exposure to swimming pools, fish tanks, or other water sources, given the distribution of the rash on her upper back, we postulate that this ubiquitous microbe inhabited her well water and a minor skin injury led to a point of entry. Although well water can be a source of *M. marinum* exposure, this is not something typically queried when screening dermatology patients for sources of infection. This should be considered in the appropriate clinical setting, including for patients using tumor necrosis factor-alpha inhibitors, such as infliximab, who are more likely to develop systemic disseminated infections affecting subcutaneous tissue.

Management of *M. marinum* infections in such patients can require several interventions. Isolates of *M. marinum* are known to be most susceptible to rifampin, rifabutin, and ethambutol; intermediate susceptible to streptomycin, clarithromycin, and sulfonamides; and susceptible or intermediate susceptible to doxycycline and minocycline.

**Fig 1.** A, Clustered erythematous papules on the central upper back 3 months prior to presentation. B, Progression of infiltrative red papules and plaques with scattered yellow crust on the upper back after 1-month isotretinoin trial prompting repeat biopsy and tissue culture.

**Fig 2.** A, Tissue sections display a dense lichenoid and diffuse granulomatous infiltrate involving the superficial and mid-dermis with associated epidermal hyperplasia. (Original magnification: X40). B, The infiltrate is composed of lymphocytes, neutrophils, and numerous multinucleated giant cells. (Original magnification: X200).
The combination of 2 agents is the preferred approach. Excellent outcomes have been reported for both localized infection and deeper structural involvement using clarithromycin and rifampin, clarithromycin and ethambutol, or ethambutol and rifampin. Typically, patients require between 1 to 2 months of therapy before reporting symptomatic improvement, though, in patients with previous tumor necrosis factor-alpha inhibitor use, complete resolution can take several additional months. Surgical debridement may be necessary in cases that fail to respond to standard therapy.

Providers should have high clinical suspicion for *M. marinum* in immunosuppressed patients with lichenoid and granulomatous histology or cutaneous CD refractory to treatment. Multiple biopsies and tissue cultures may be necessary for identifying the correct diagnosis. Education of patients regarding the risks of certain environmental exposures, including well water, and awareness of potential disseminated infections is important. Ultimately, this case highlights the variable presentation of cutaneous mycobacterial infection and how rapid recognition may prevent disease progression.

Conflicts of interest
None disclosed

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