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Case Presentation

Mycobacterium fortuitum infection arising in a new tattoo

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Abstract

We report an uncommon case of a cutaneous infection with *Mycobacterium fortuitum* arising in a new tattoo. A 29-year-old man presented with a several month history of a non-pruritic papular eruption within a tattoo; the papules developed 1-to-2 weeks after the tattoo procedure. He denied similar symptoms with previous tattoos. He had been treated unsuccessfully with cephalexin. Histopathologic examination revealed perifollicular chronic and granulomatous inflammation, consistent with chronic folliculitis. Acid-fast bacilli culture identified *Mycobacterium fortuitum* complex. The patient was treated with a 2-month course of oral trimethoprim-sulfamethoxazole (160mg/800mg twice daily) and ciprofloxacin (250 mg twice daily), with clinical improvement at follow up after three weeks of the antibiotic regimen. Rapidly growing mycobacteria have emerged as a cause of tattoo-associated cutaneous infection in recent years. Diagnosis and treatment can be difficult without clinical suspicion. *M. fortuitum* and other rapidly growing mycobacteria should be considered in the differential diagnosis of tattoo-associated dermatologic complications.

Key words: tattoo, Mycobacterium fortuitum, rapidly growing mycobacteria, nontuberculous mycobacteria, infection

Introduction

Nontuberculous mycobacteria (NTM) can infect skin and soft tissue through direct inoculation from the environment [1, 2]. Although most pathogenic NTM species can cause cutaneous infection, rapidly growing mycobacterial (RGM) species *Mycobacterium chelonae*, *Mycobacterium abscessus*, and *Mycobacterium fortuitum* are most commonly implicated in the United States [1, 2]. RGM cutaneous infections have been associated with an increasing number of procedures, including augmentation mammoplasty, liposuction, long-term catheterization, acupuncture, and pedicures [1, 2, 3].

Recently, infections related to RGM have been observed after tattoo procedures [4 - 17]. In 2003, Wolf and Wolf described the first case of tattoo inoculation of atypical mycobacteria [17]. *M. chelonae* is the most frequent species reported with tattoos, in single cases [5, 8, 11, 13, 16] and outbreaks [6, 7, 9, 15]. *M. abscessus* has also been reported [4, 12, 15]. *M. fortuitum* tattoo inoculation was only recently described in a single case in Thailand [14].

We report an uncommon case of cutaneous infection with *Mycobacterium fortuitum* arising in a new tattoo.

Case synopsis

A 29-year-old man with well-controlled diabetes mellitus presented with a several month history of a non-pruritic papular eruption within a black-ink tattoo. The papules developed 1-to-2 weeks after the tattoo procedure. He denied similar symptoms with previous tattoos. Prior treatment included a 7-day course of oral cephalexin 500 mg four times daily without improvement.

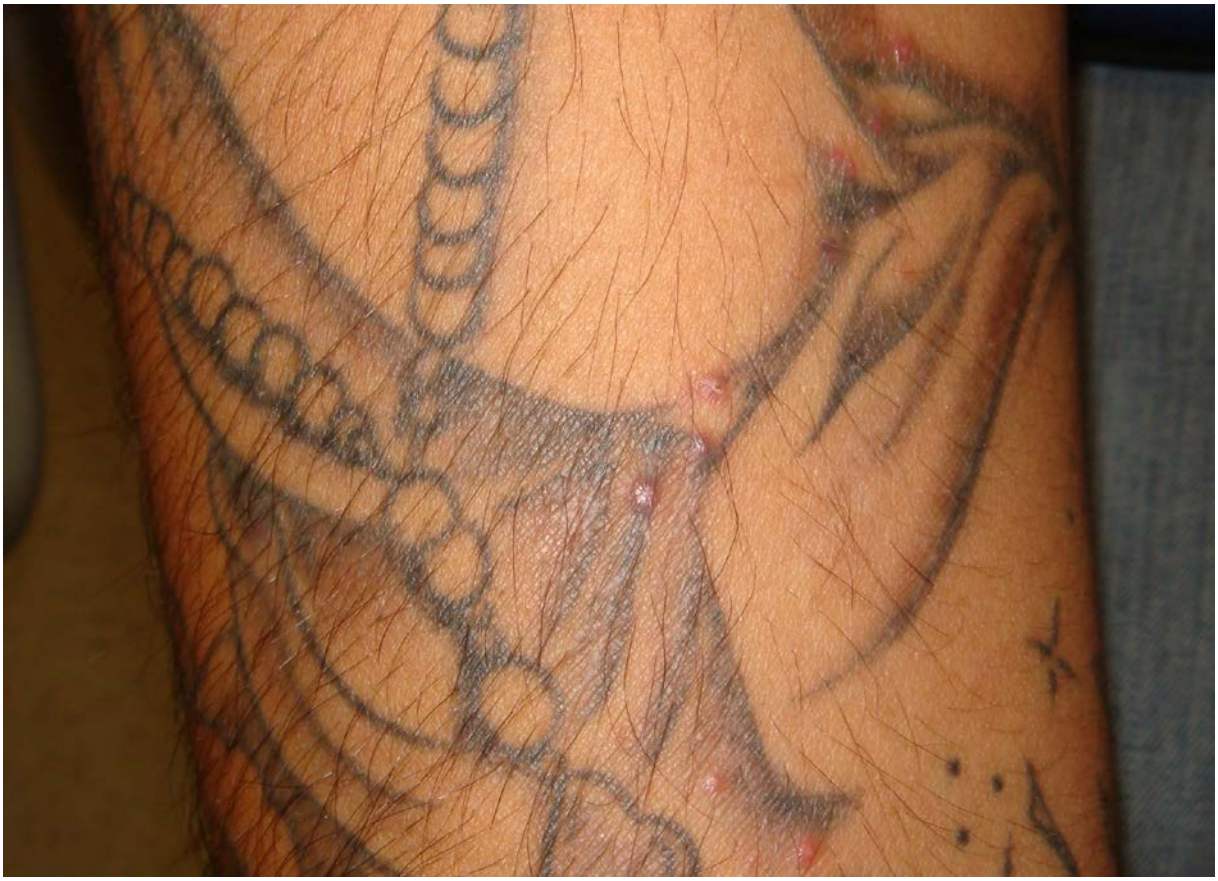

Figure 1. Scattered crusted erythematous papules were confined to the black-ink tattooed areas.

The patient was an afebrile, healthy-appearing man. Scattered crusted erythematous papules were confined to the black-ink tattooed areas of the right forearm (Figure 1), without associated lymphadenopathy.

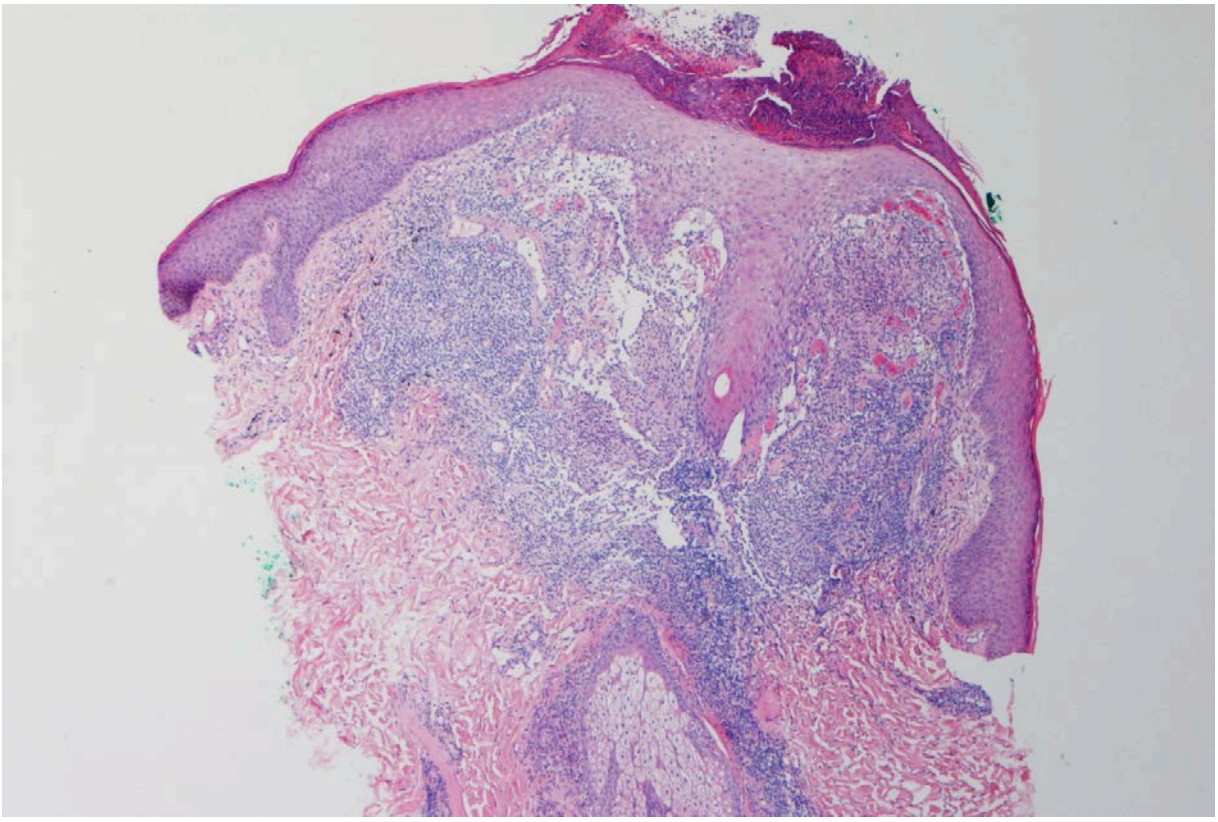

Figure 2. H&E stain, low power: Perifollicular chronic and granulomatous inflammation, consistent with chronic folliculitis

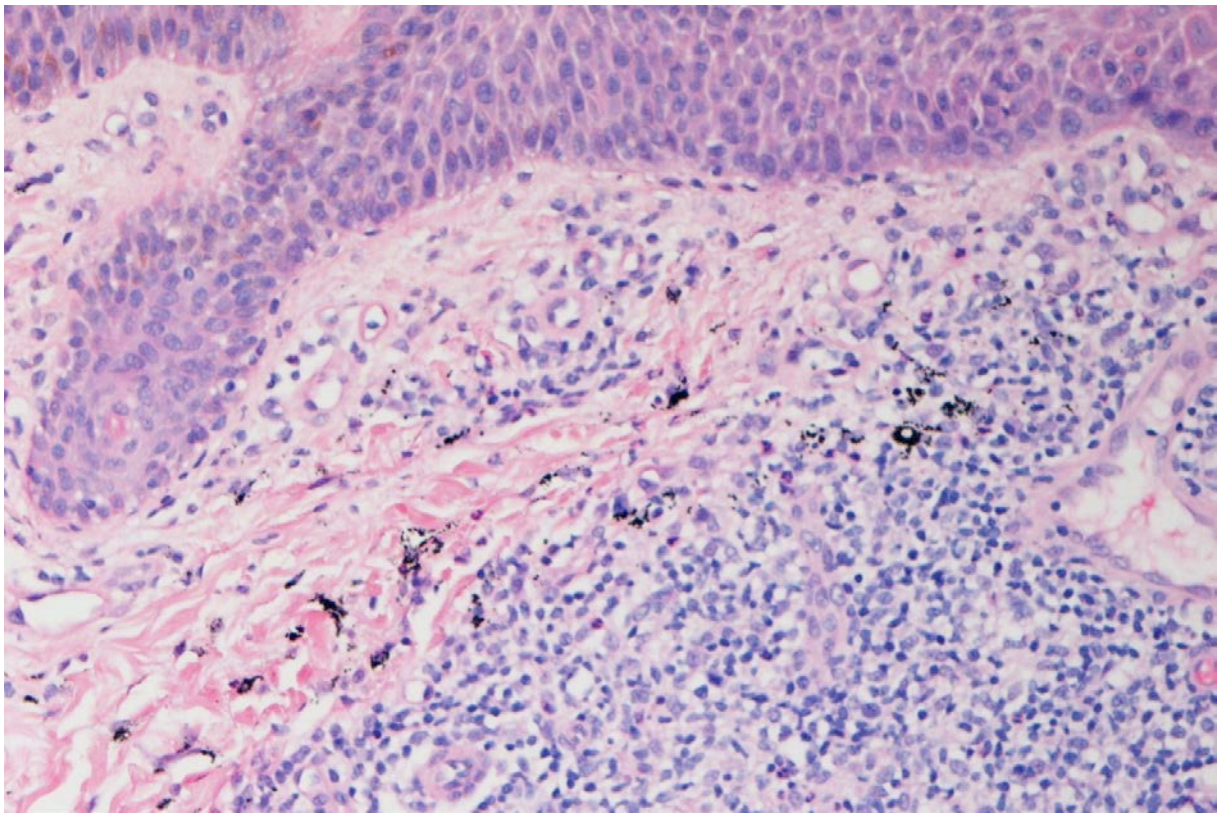

Figure 3. H&E stain, high power: Perifollicular chronic and granulomatous inflammation, consistent with chronic folliculitis is exhibited. Tattoo pigment is present in the dermis.

A punch biopsy specimen from a papule was sent for histopathology and culture. Histopathology revealed perifollicular chronic and granulomatous inflammation, consistent with chronic folliculitis (Figures 2, 3). Aerobic and fungal cultures were negative. AFB culture grew *Mycobacterium fortuitum* complex sensitive to amikacin, ciprofloxacin, and trimethoprim-sulfamethoxazole, with intermediate sensitivity to clarithryomycin and imipenem.

The patient was diagnosed with tattoo-inoculated *Mycobacterium fortuitum* complex cutaneous infection. He was treated empirically with oral ciprofloxacin and clarithromycin. Based on susceptibility, clarithromycin was discontinued and a 2-month course of oral trimethoprim-sulfamethoxazole (160mg/800mg twice daily) and ciprofloxacin (250 mg twice daily) was initiated. At follow up, the patient had clinical improvement after three weeks of this antibiotic regimen.

Discussion

According to a survey in 2006, 24% of Americans between the ages of 18 and 50 years have a tattoo [18]. Tattoo-associated dermatological complications include allergic reactions to ink pigment, coincidental lesions such as sarcoidosis and malignancy, Koebner response with psoriasis, and infection. *S. aureus* and *S. pyogenes* are common organisms associated with tattoo infection. However, tattoo-inoculation of *Mycobacterium tuberculosis*, *Mycobacterium leprae*, *Treponema pallidum*, *Clostridium tetani*, herpes viruses, papillomavirus, molluscum contagiosum virus, and Zygomycoses have also been reported [19, 20].

In the past decade, rapidly growing, nontuberculous mycobacteria have emerged as a rare cause of tattoo-associated infection [4 - 17]. Tattoo ink is likely contaminated with RGM by dilution with tap water, typically in the tattoo parlor. However, a recent outbreak in the US revealed that RGM contamination can occur during the ink manufacturing process [9, 15]. *M. chelonae* is the most frequent species reported with tattoos, in single cases [5, 8, 11, 13, 16] and outbreaks [6, 7, 9, 15]. *M. abscessus* has also been reported [4, 12, 15]. Our patient had *Mycobacterium fortuitum* infection, which has only been reported in a single case in Thailand [14].

Mycobacterium fortuitum complex is a group of nonpigmented, rapidly growing, nontuberculous mycobacteria, composed of 12 species, including *M. fortuitum* [1]. It is found in diverse climates worldwide and has been isolated from soil, water, animals, plant material, and birds [1, 2]. Tap water is a major reservoir, in which biofilms support growth, resist disinfectants, and likely aid in transmission [1]. Humans are infected by environmental exposure; neither animal-to-human nor human-to-human spread has been demonstrated [2].

M. fortuitum causes skin, soft tissue, bone, and joint disease in both immunocompetent and immunosuppressed individuals. Cutaneous disease occurs through direct inoculation from the environment and is typically associated with medical procedures or traumatic injury to the skin. Recent cases of *M. fortuitum* skin and soft tissue infection have been reported related to nosocomial outbreaks (e.g., post-operative, post-injection, long-term intravenous catheters, and post-liposuction). Less commonly, *M. fortuitum* is implicated in chronic bronchopulmonary disease, lymphadenitis, and disseminated infection [1, 2].

Our patient's presentation was similar to previous reports of rapidly growing, nontuberculous mycobacteria in tattoos. Reported infections occurred in healthy individuals who were otherwise asymptomatic. Lesions appeared within a few days to several weeks after the tattoo procedure and were confined to tattooed areas. Clinical presentation varied and included painful, pruritic, or asymptomatic papules, pustules, nodules, ulcers, and plaques. Infections frequently remained undiagnosed for months and often had been unsuccessfully treated with topical corticosteroids, topical antibiotics, or oral antibiotics (including doxycycline and cephalexin) [4 – 17].

Based on our patient's clinical presentation with persistent lesions despite cephalexin treatment and histopathology consistent with chronic folliculitis, the differential diagnosis included deep fungal and atypical mycobacterial infections. Skin biopsy for culture revealed the diagnosis. Previous reports of RGM demonstrate that the diagnosis can be difficult even with clinical suspicion. AFB stains are frequently negative and successful culture requires skin biopsy or a heavily charged cutaneous swab sent specifically for mycobacterial detection [4 – 17]. Even under optimal culture conditions, the organism may not be isolated [6, 7, 9, 10, 15]. In an outbreak in France, *M. chelonae* was isolated from only 13 out of 30 (43%) cultures [7]. Similarly, in an outbreak in the United States, *M. chelonae* was isolated from only 14 of 17 tissue cultures [9].

When RGM are isolated, species identification is recommended and can be performed using in vitro antibiotic susceptibility testing, polymerase chain reaction restriction endonuclease assay, or gene sequencing. Susceptibility testing should be performed to guide treatment. Isolates are typically susceptible to amikacin, sulfonamides, imipenem, ciprofloxacin, and ofloxacin. *M. fortuitum* is less susceptible to clarithromycin, cefoxitin, and doxycycline [1, 2]. Despite apparent 80% susceptibility to clarithromycin, the medication should be used judiciously owing to the presence of an inducible erm (39) gene in all *M. fortuitum* isolates, which confers resistance to macrolides [21]. Recommended duration of therapy is four-to-six months, with empiric treatment until susceptibility results become available [1, 6]. At least two antimicrobials with in vitro activity should be used to ensure successful treatment [2].

Conclusion

RGM have emerged as a rare cause of tattoo-inoculated infection. The clinical presentation is variable and can resemble other tattoo-associated dermatological complications. Therefore, the diagnosis is frequently missed initially.

M. fortuitum and other RGM should be included in the differential diagnosis of infection in a recent tattoo, especially with absence of bacterial growth on routine culture and if unresponsive to traditional antimicrobials. When suspected, biopsy of the lesion should be sent for culture and susceptibility testing, as well as histopathology to exclude other causes. Treatment for four-to-six months with at least two antimicrobials with in vitro activity should be used to ensure complete resolution [1, 2, 6].

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