BRIEF ARTICLES

Mycobacterium Kansasii Infection Overlying Tattoo Pigment in an Immunocompromised Patient

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ABSTRACT

The incidence of atypical mycobacterial infections has steadily grown over the past decades, and it is well-known that the risk of progressive disease increases with immunodeficiency. While rare, tattoo pigment can serve as a nidus for atypical mycobacterium infection in immunocompromised individuals. Here, we present a case of a 41-year-old immunocompromised female who presented with verrucous plaques overlying long-standing tattoos in multiple locations. The patient's lesions were biopsied and sent for board-range polymerase chain reaction revealing infection with *Mycobacterium kansasii*, a slow-growing atypical mycobacterium that rarely causes cutaneous disease without systemic symptoms. Early recognition and treatment of cutaneous *M. kansasii* is important to prevent progression of disease.

INTRODUCTION

Atypical mycobacterium infections are those caused by mycobacteria other than *Mycobacterium tuberculosis* and *Mycobacterium leprae*.[1] The incidence of these infections has steadily grown over the past decades, and it is well-known that the risk of progressive disease increases with immunodeficiency.[2] Eleven species organized into four groups have been identified as causes of cutaneous atypical mycobacterium infections.[1] Given the presentation of cutaneous mycobacterial infections varies based on the causative organism and can mimic other diseases, diagnosis of these skin lesions is often delayed.[1] This may lead to progression of disease; therefore, it is imperative that providers maintain clinical suspicion of atypical mycobacterium infections among immunocompromised patients and be familiar with presentations of disease. Here, we present a case of *Mycobacterium kansasii* infection overlying long-standing tattoo pigment in an immunocompromised individual with no systemic signs of infection.

CASE PRESENTATION

A 41-year-old African American woman presented to the emergency department for a 3-month history of progressive and painful skin lesions on her extremities. During her evaluation, she was noted to have verrucous papules and nodules coalescing into plaques within the tattoos on her right forearm and left shin (Figure 1). She reported that the tattoos were obtained from different tattoo parlors years ago. The

Figure 1. Verrucous lesions on the right forearm confined to the area of the patient's tattoo.

patient had a known history of HIV, was not on anti-retroviral therapy at the time, and presented with a CD4 count of 13. The patient denied any other complaints, including chest pain, shortness of breath, cough, and night sweats. Outside of the patient's cutaneous lesions, physical exam was unremarkable. A punch biopsy of the lesion on the left shin demonstrated extensive granuloma formation in the dermis with focal necrosis and positive acid-fast bacillus (AFB) staining (Figure 2). The patient's tissue was sent to the University of Washington Medical Center for broad-range polymerase chain reaction (PCR), which was positive for *Mycobacterium kansasii*.

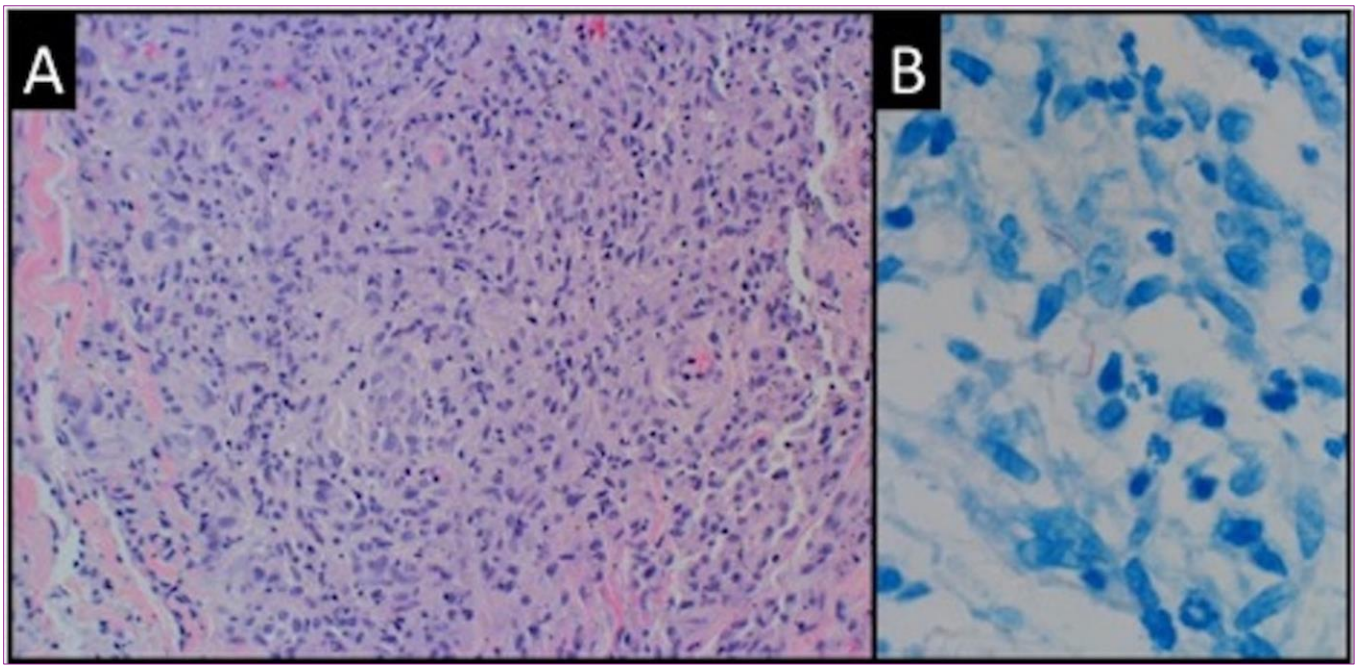
The patient was continued on isoniazid, rifabutin, and ethambutol after being empirically treated with azithromycin, pyrazinamide, isoniazid, rifabutin, and ethambutol. In the subsequent 3 months, the patient developed additional painful nodules on the palms, generalized lymphadenopathy, pulmonary nodules, and sclerotic lesions on the sternum, all likely sequelae of disseminated *Mycobacterium kansasii*, with confirmation following repeat biopsy. Thus, azithromycin was added back to the treatment regimen given concern for rifampin-resistance, and the patient was documented to have improvement at the two month follow-up.

DISCUSSION

Atypical mycobacterial infections overlying tattoo pigment are rare, with cases mostly stemming from sporadic outbreaks.[3] These infections most commonly present shortly after placement of the tattoo on the skin.[4] They are thought to originate from mycobacterial contamination of tattoo equipment or the tattoo pigment, or bacterial inoculation of breaks in the skin surface caused by the tattooing process, and they can occur in both healthy and immunocompromised individuals.[4] We describe a case of *M. kansasii* infection occurring over long-standing black tattoo pigment in an HIV-positive patient.

M. kansasii is a slow-growing, acid-fast bacillus found in water reservoirs, swimming pools, and tap water most commonly in the southern and central United States. Most infections occur in middle-aged men and present much like *M. tuberculosis* – productive cough, night sweats, and chest pain.[5] *M. kansasii* rarely causes cutaneous lesions compared to faster-growing

Figure 2. (**A**) Histopathology revealed granulomatous inflammation with scattered associated neutrophils (H&E, 200x) (**B**) Acid-fast bacilli are present (AFB stain, 1000x).



counterparts such as *M. avium* complex, *M. abscessus-chelonae* complex, and *M. fortuitum*; however, skin lesions are often the first sign of disseminated disease.[6] Cutaneous infection may manifest as verrucous lesions, nodules, pustules, erythematous plaques, and ulcers.[5] In the immunocompromised host, atypical cutaneous manifestations can develop including diffuse abscesses, seromas, and cellulitis, often with divergent histological findings such as the absence of granulomas.[7] This can delay diagnosis and treatment, potentially leading to the development of systemic complications such as sepsis.

Lesion discharge culturing is the gold standard diagnosis of cutaneous *M. kansasii* infection.[6] Biopsy of lesions may also be performed, and histopathology shows acid-fast bacilli and granuloma formation with mixed inflammatory infiltrate.[8] Epidermal necrosis and abscess formation may also be present.[1] These histological findings are identical to those of cutaneous *M. tuberculosis* infection; therefore, although biopsy can secure a diagnosis of mycobacterial infection, isolation of the organism must be done to diagnose *M. kansasii* infection specifically. In cases where sufficient material for culturing is not available, broad-range polymerase chain reaction (PCR) from a tissue sample can be used to identify the organism.

The prognosis of cutaneous *M. kansasii* infection worsens with progressive dissemination and immunosuppression, and outcomes vary based on individual response to treatment.[9] Traditional therapy includes at least one year of rifampin, isoniazid, ethambutol, and pyridoxine;[10] however, prior to the initiation of therapy, susceptibility testing with rifampin is recommended given that many strains of *M. kansasii* demonstrate multi-drug resistance.[6] In cases of therapy resistance, clarithromycin or azithromycin must be substituted.[10] To further complicate treatment, rifampin should

be replaced by rifabutin in HIV-positive patients who are taking non-nucleoside reverse transcriptase inhibitors (NNRTI) or protease inhibitors in order to minimize drug interaction.[5]

While atypical mycobacterium infection is one explanation for the development of verrucous plaques on long-standing tattoo pigment, the differential for such lesions should include sarcoidosis, HPV-associated warts (i.e., verrucae), rupioid syphilis, pseudoepitheliomatous hyperplasia, blastomycosis, chromoblastomycosis, and rarely squamous neoplasms. Although careful history and physical exam may identify systemic symptoms associated with each etiology, a definitive diagnosis is usually reached following culturing or skin biopsy.

CONCLUSION

We present a case of cutaneous *Mycobacterium kansasii* infection overlying tattoo pigment in an immunocompromised individual. This case demonstrates the importance of considering atypical mycobacterium infections in patients not only with new tattoos, but also in long-standing tattoo pigment.

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