Nonhealing Vegetating Plaque on the Finger: Tuberculosis Verrucosa Cutis

Philip Matthew Laws, MB, MRCP; Minal Singh, MB, MRCP; Robert Chalmers, MB, FRCP

Tuberculosis verrucosa cutis is an uncommon form of tuberculosis that typically presents as a chronic warty plaque. It develops in individuals with moderate to high immunity to Mycobacterium tuberculosis *due to inoculation of an open wound. We present the case of a Somali man born in the United Kingdom who presented with a nonhealing ulcer on the right hand of 10 years' duration. The patient was diagnosed with tuberculosis verrucosa cutis based on clinical suspicion, which was confirmed by several investigations including strongly positive results of a Mantoux test, IFN-γ release assay, typical histology on skin biopsy, and polymerase chain reaction (PCR) analysis positive for mycobacterial DNA. Treatment with quadruple antituberculous therapy produced rapid resolution of the ulcer. This unusual condition often is overlooked in the differential diagnosis of nonhealing ulcers, yet it has an excellent prognosis with treatment. A high index of suspicion is required.*

Cutis. 2011;87:30-33.

The World Health Organization estimates that one-third of the world population is infected with tuberculosis, with approximately 9 million new cases reported annually.[1] Multidrug resistance and immunosuppression secondary to human immunodeficiency virus infection are important factors contributing to the dramatic increase in worldwide prevalence. Cutaneous tuberculosis is an uncommon manifestation of infection but one that is likely to increase in incidence in line with the global surge in disease burden.

From Dermatology Centre, Salford Royal Hospital, Manchester, United Kingdom.

The authors report no conflict of interest.

Correspondence: Philip Matthew Laws, MB, MRCP, Dermatology Centre, Salford Royal Hospital, Manchester, Stott Lane, Salford, Greater Manchester M6 8HD, United Kingdom (phillaws@yahoo.com).

Case Report

A 21-year-old Somali man born in the United Kingdom presented to dermatology with a nonhealing ulcer overlying the second metacarpophalangeal joint of the right hand of 10 years' duration. The lesion had developed at the site of an open fracture of the head of the second metacarpal bone that was caused by a sports injury at 10 years of age. It had initially been treated with multiple courses of antibiotics without response. One year following his injury, he underwent exploratory surgery to exclude osteomyelitis as a possible cause for the failure of his wound to heal, but no evidence was found. The possibility of tuberculosis was considered but discounted on the basis of a biopsy with negative results for acid-fast bacilli.

The patient had no other relevent medical history and was not on any regular medications. As a neonate he had been immunized against bacille Calmette-Guérin (BCG). On direct questioning, he recalled that his uncle had been receiving treatment of pulmonary tuberculosis at the time of the injury.

Clinical examination revealed a vegetating erythematous plaque measuring 40×22 mm overlying the second metacarpophalangeal joint of the right hand (Figures 1A and 1B). The surface was crusted and eroded in areas with infiltration of the underlying tissues. The remaining physical examination was normal.

Given the suspicion of tuberculosis verrucosa cutis, the following investigations were performed: chest radiograph; skin biopsy, with samples sent for mycobacterial culture and polymerase chain reaction (PCR) analysis; and Mantoux test. The chest radiograph was unremarkable while the Mantoux test was strongly positive. An IFN-γ release assay for *Mycobacterium tuberculosis* was performed and found to be positive.

Histology revealed pseudoepitheliomatous hyperplasia, marked dermal inflammation and fibrosis, microabscesses, and noncaseating granulomas (Figure 2). Staining for acid-fast bacilli was

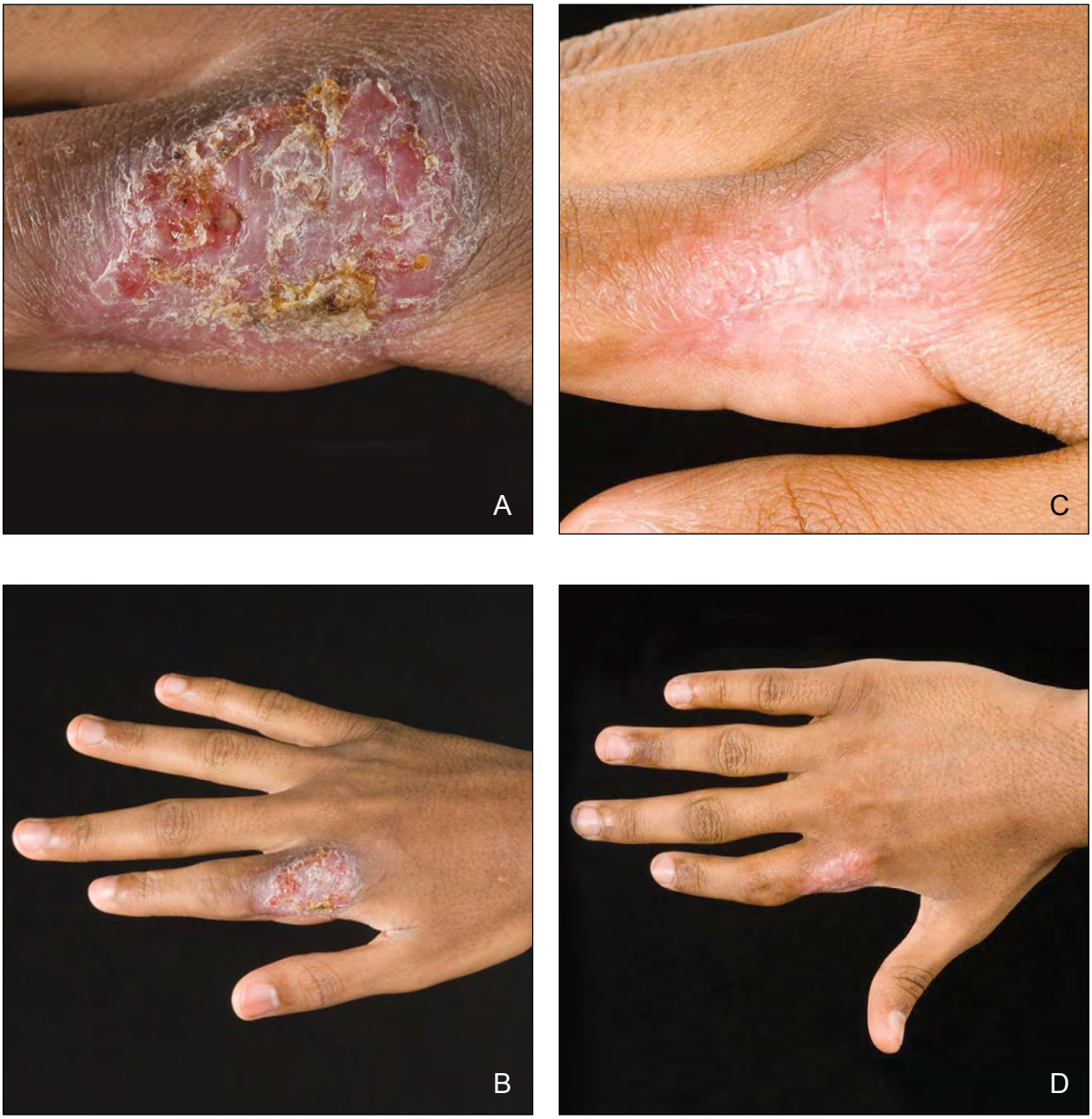

Figure 1. Vegetating erythematous plaque measuring 40×22 mm overlying the second metacarpophalangeal joint of the right hand (A and B). Mild residual scarring was present following a 6-month course of antituberculous therapy (C and D).

negative, as previously reported, while PCR was positive for mycobacterial DNA. Culture for mycobacteria was negative.

These findings supported the clinical diagnosis of tuberculosis verrucosa cutis and the patient was referred to the local tuberculosis unit where he was treated with a 6-month course of quadruple antituberculous chemotherapy consisting of rifampicin, isoniazid, pyrazinamide, and ethambutol. By 6 weeks of treatment, the skin had completely healed with only mild residual scarring (Figures 1C and 1D).

Comment

Cutaneous tuberculosis can present in a number of ways depending on the route of infection and the immune status of the host.[2,3] The outcome following inoculation of mycobacteria into the skin depends on whether the host has previously encountered *M tuberculosis* or BCG. In the immunologically

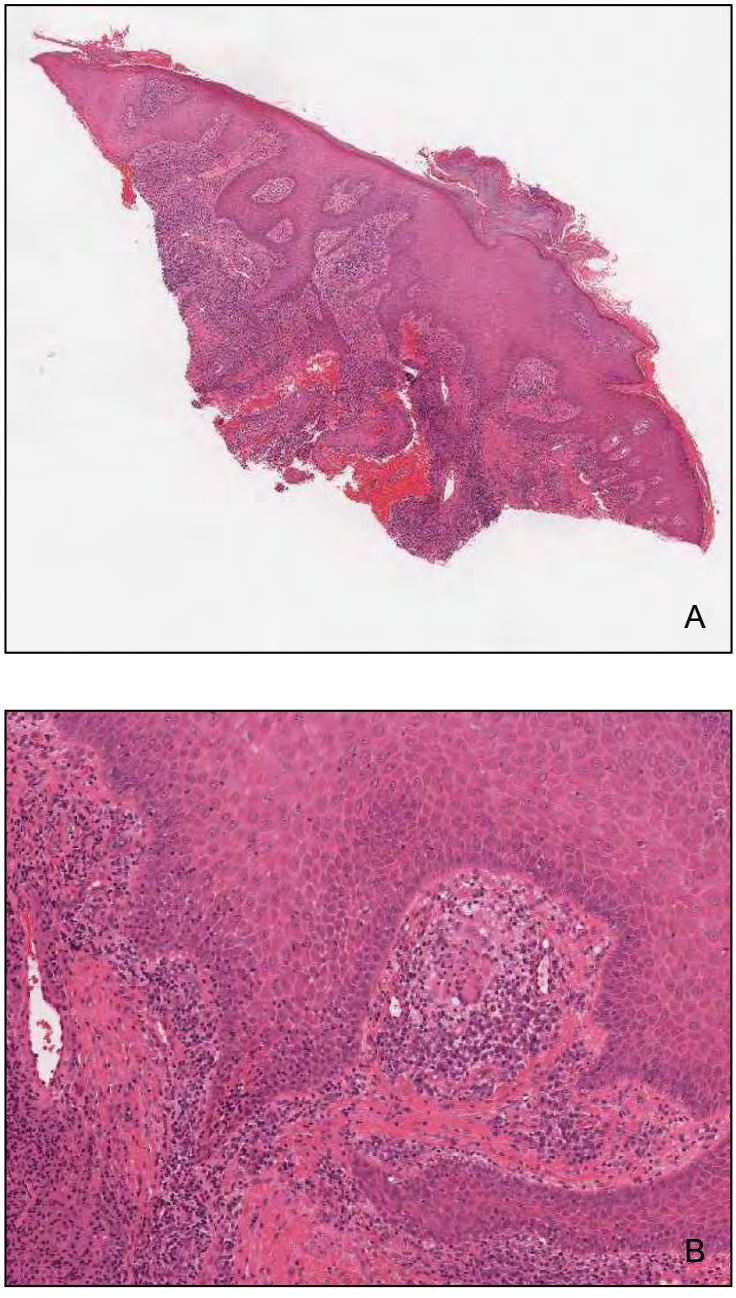

Figure 2. Histology demonstrating pseudoepitheliomatous hyperplasia, marked dermal inflammation and fibrosis, microabscesses, and noncaseating granulomas (A and B) (H&E; original magnifications ×4 and ×10, respectively).

primed individual, infection may remain localized over many years with small numbers of organisms and a well-developed chronic inflammatory response (tuberculosis verrucosa cutis). However, in the immunologically naïve, organisms can readily multiply to form a nodule or ulcer (tuberculous chancre) from which organisms often will invade local lymph nodes (tuberculous lymphadenitis). Secondary tuberculous infection of the skin may result from underlying acute tuberculous lymphadenitis with ulceration and sinus formation (scrofuloderma); in patients with moderate host immunity, small numbers of mycobacteria may reach the skin via the lymphatics (or less commonly from inoculation or hematogenous spread) and be localized in one or more slowly enlarging plaques by a chronic granulomatous host response (lupus vulgaris). In individuals with florid tuberculosis of internal organs (eg, lung, intestine), mycobacteria may invade local mucosal surfaces (orificial tuberculosis). Miliary tuberculosis or metastatic tuberculous abscesses result from hematogenous spread of mycobacteria in patients with overwhelming infection.

Tuberculosis conventionally is diagnosed on the basis of clinical findings, chest radiography,

microbiologic culture, tissue biopsy, PCR analysis of tissue biopsy, and response to the Mantoux test. More recently, a serologic test that measures release of IFN-γ from lymphocytes in response to challenge with *M tuberculosis*–derived purified protein derivative (tuberculin) has been advocated for identifying patients with latent or active tuberculosis.[4,5] This assay can overcome the problems of Mantoux testing including risks for both false-negative (host immunosuppression) and false-positive (BCG vaccination) reactions.[6] Detection of active tuberculosis by the IFN-γ assay in nonimmunocompromised individuals is reported to provide a sensitivity of up to 97% and a specificity approaching 100%.[4]

Tuberculosis verrucosa cutis was classically seen in anatomists dissecting cadavers from patients who had died from tuberculosis (so-called prosector's wart). Confirmation of the diagnosis can be difficult because there are few organisms and they can be difficult to demonstrate either by acid-fast staining or by culture. In our patient, the detection of mycobacterial DNA by PCR analysis and the positive IFN-γ release assay both supported our clinical diagnosis, which was further confirmed by the rapid response to antituberculous therapy.

Conclusion

Mycobacterial infection should be considered in any chronic, painless, nonhealing ulcer. Although tuberculosis verrucosa cutis is rare, it should not be forgotten. Diagnosis relies primarily on a high degree of clinical suspicion.

REFERENCES

1. Global tuberculosis control: a short update to the 2009 report. World Health Organization Web site. http://www.who.int/tb/publications/global_report/2009/update/en/index.html. Accessed December 8, 2010.
2. Burns T, Breathnach SM, Cox N, et al, eds. *Rook's Textbook of Dermatology*. 8th ed. Oxford, United Kingdom: Wiley Blackwell; 2010.
3. Lai-Cheonj JE, Perez A, Tang V, et al. Cutaneous manifestations of tuberculosis [published online ahead of print March 21, 2007]. *Clin Exp Dermatol*. 2007;32:461-66.
4. Lalvani A. Diagnosing tuberculosis infection in the 21st century: new tools to tackle an old enemy. *Chest*. 2007;131:1898-1906.
5. Bravo FG, Gotuzzo E. Cutaneous tuberculosis. *Clin Dermatol*. 2007;25:173-180.
6. Rothel JS, Andersen P. Diagnosis of latent *Mycobacterium tuberculosis* infection: is the demise of the Mantoux test imminent? *Expert Rev Anti Infect Ther*. 2005;3:981-993.