Expanding Pruritic Plaque on the Forearm

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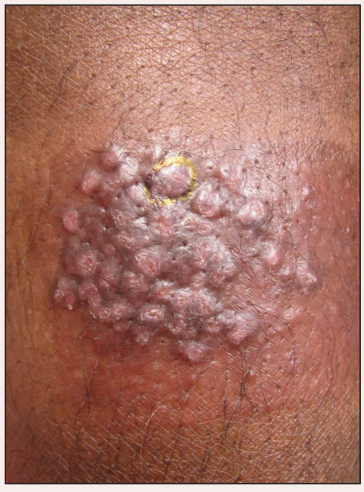

A 66-year-old male firefighter initially presented to the emergency department with an expanding pruritic plaque on the dorsal aspect of the right forearm. The patient recalled the appearance of a single 3-mm papule shortly after doing yardwork in Biloxi, Mississippi. He remembered getting wet grass on the arms, which he later washed off without any notable trauma. The single papule grew into a larger plaque over the next month. In the emergency department he was treated with sulfamethoxazole-trimethoprim, mupirocin, and clotrimazole without response. He was referred to the dermatology department 6 months later and was noted to have multiple 3- to 4-mm papules that coalesced into a 4-cm lichenified plaque with surrounding erythema on the right forearm. His medical history was notable for type 2 diabetes mellitus, hypertension, and hyperlipidemia. The remainder of the physical examination and review of systems was negative.

What's the diagnosis?

a. chromoblastomycosis
b. cutaneous protothecosis
c. granuloma annulare
d. lichen planus
e. pyoderma gangrenosum

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The authors report no conflict of interest.

The opinions offered are those of the authors and do not represent the official position of the US Air Force or the Department of Defense.

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The Diagnosis: Cutaneous Protothecosis

A 4-mm punch biopsy of the plaque on the right forearm was performed. The biopsy showed chronic inflammation with prominent histiocytes, foreign body giant cells, plasma cells, and abundant eosinophils (Figure 1). Grocott-Gomori methenamine-silver stain demonstrated abundant soccer ball–like or floretlike sporangia that were 3 to 11 μm, consistent with a diagnosis of protothecosis (Figure 2).

Cutaneous protothecosis is an infection caused by chlorophyll-lacking algae of the genus *Prototheca*.[1] It is ubiquitous in nature and can be isolated from various reservoirs such as trees, grass, water, and food sources.[2] Protothecosis is present worldwide and in the United States; it is most prevalent in the Southeast. *Prototheca* species are rare but often endemic in cattle and can cause bovine mastitis and enteritis.[3] However, they are rare opportunistic infections in humans.

The pathogenesis of cutaneous protothecosis is largely unknown.[4] However, most infections are thought to be caused by traumatic inoculation into subcutaneous tissues.[1,2] The majority of cases occur in patients older than 30 years. To date, approximately 160 cases have been reported in the literature worldwide.[5] There are 3 main species of *Prototheca*, but almost all human infections are caused by *Prototheca wickerhamii*.[2] Clinically, most patients with protothecosis present with cutaneous findings, but olecranon bursitis and systemic forms also have been reported.[1]

Risk factors for protothecosis include immunosuppression, most often due to steroids, in addition to malignancies, diabetes mellitus, and certain occupations.[1] The presentation can be variable from papules and plaques to even herpetiform appearances.[4] Protothecosis usually affects the skin and soft tissues of exposed areas such as the extremities or the face.[6] Diagnosis largely is made on detection of characteristic floretlike sporangia with a prominent cell wall on histopathological examination. *Prototheca wickerhamii* specifically produces a morula form of sporangia with endospores arranged symmetrically, giving it a characteristic soccer ball appearance.[2]

Treatment of protothecosis is difficult and remains controversial.[1] There are no established protothecosis treatment protocols or guidelines due to the small number of cases.[7] In vitro studies have demonstrated sensitivity to amphotericin B and various azoles as well as a wide range of antibiotics.[1] Olecranon bursitis and small skin lesions can be treated by surgical excision. All other *Prototheca* infections require systemic treatment with azoles or intravenous amphotericin B for immunocompromised patients or those with disseminated disease.[5] However, failure to respond to medical management often occurs, requiring surgical excision.[1,6]

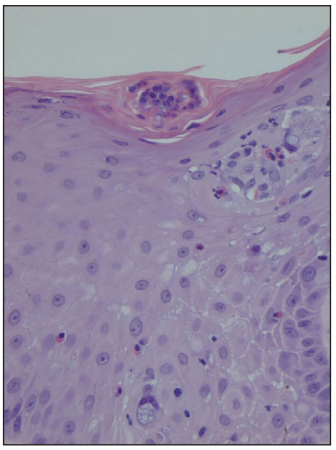

Figure 1. Chronic inflammation with prominent histiocytes, foreign body giant cells, plasma cells, and abundant eosinophils (H&E, original magnification ×10).

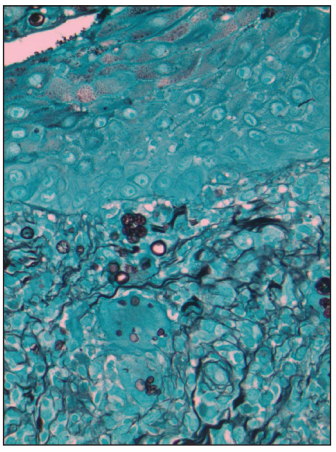

Figure 2. Grocott-Gomori methenamine-silver stain demonstrated abundant soccer ball–like or floretlike sporangia that were 3 to 11 μm (original magnification ×10).

Our patient was treated with a 3-month course of voriconazole but therapy failed and the plaque continued to expand. The patient underwent a wide excision that was repaired with a partial-thickness skin graft. Rebiopsy of the papule adjacent to the skin graft showed no further recurrence.

In conclusion, protothecosis generally is not clinically suspected and patients are subjected

to various treatments without adequate results. A definitive diagnosis easily can be established with a skin biopsy, which can direct timely and appropriate treatment.

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