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Case Report

Human Protothecosis: Case Report of a Rare Algal Infection

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Abstract

Protothecosis: is a rare disease caused by opportunistic algae infection of the genus Prototheca. An 84-year-old female patient has presented with an erythematous, infiltrated, papulopustular plaque with areas of central atrophy on the left forearm for the past 10 months. Histopathology revealed structures similar to morulae, corresponding to algae, and culture was positive for Prototheca spp. Itraconazole 200 mg/day was prescribed, resulting in improvement of cutaneous lesions. Protothecosis has a high potential for underreporting and misdiagnosis due to its rarity and clinical similarities with other dermatoses. The patient in this study presented a lesion in a typical area due to the ease of trauma and entry point, with a good therapeutic response to oral antifungal monotherapy.

Keywords: Protocetosis; Prototheca; Algae; Case Report; Dermatology; Histopathology; Antifungal

Introduction

Protothecosis is a rare disease caused by infection with achlorophyllic algae of the genus Prototheca, capable of triggering illnesses in patients with weakened immune systems, especially in diabetic patients, those on chronic corticosteroid therapy, transplant recipients, individuals with malignant diseases, and Human Immunodeficiency Syndrome (HIV) [1,2]. The primary manifestation of the infection typically involves cutaneous involvement, with the presence of papules and erythematous plaques, as well as tumors and even chronic ulcers, including subcutaneous nodules [1-4]. In the literature, there are few documented cases of human infection worldwide by Prototheca, and even scarcer are the details regarding dermatoscopy, a useful tool in clinical practice for patient assessment and diagnostic hypothesis formulation.

Case Report

An 84-year-old woman with diabetes and hypertension has been experiencing an erythematous-infiltrated, papulopustular plaque for the past 10 months, measuring 16.5 cm x 6 cm, located on the left forearm (Fig. 1). The lesion has irregular contours and sharp borders, with areas of central atrophy. She reported pain and associated pruritus. She mentioned that the lesion started as a small reddish plaque that appeared after a blunt trauma caused by hitting the aluminum window of her residence. She had undergone various previous treatments, including emollients, corticosteroids, and topical antifungals, without improvement. Dermatoscopy revealed diffuse erythema and amorphous yellowish areas, with whitish areas suggestive of fibrosis/atrophy, along with numerous isolated pustules surrounded by polymorphic vessels of various calibers radiating from the center of the pustules (Fig. 2).

Direct mycological examination was negative, and histopathological examination showed acanthosis, multiple granulomas in the dermis and adjacent subcutaneous tissue, mixed inflammatory infiltrate including neutrophils and lymphocytes, with visualization of a structure resembling morulae using PAS and Grocott methods, corresponding to the presence of an alga (Fig.

3). Culture of the sample demonstrated a positive result for Prototheca spp. Correlation of clinical and pathological findings led to the diagnosis of human protothecosis. Itraconazole 100 mg twice daily was prescribed for treatment. The patient is under follow-up, showing improvement in clinical (Fig. 4) and dermatoscopic aspects, with reduced erythema and diffuse amorphous yellowish areas, and resolution of pustules.

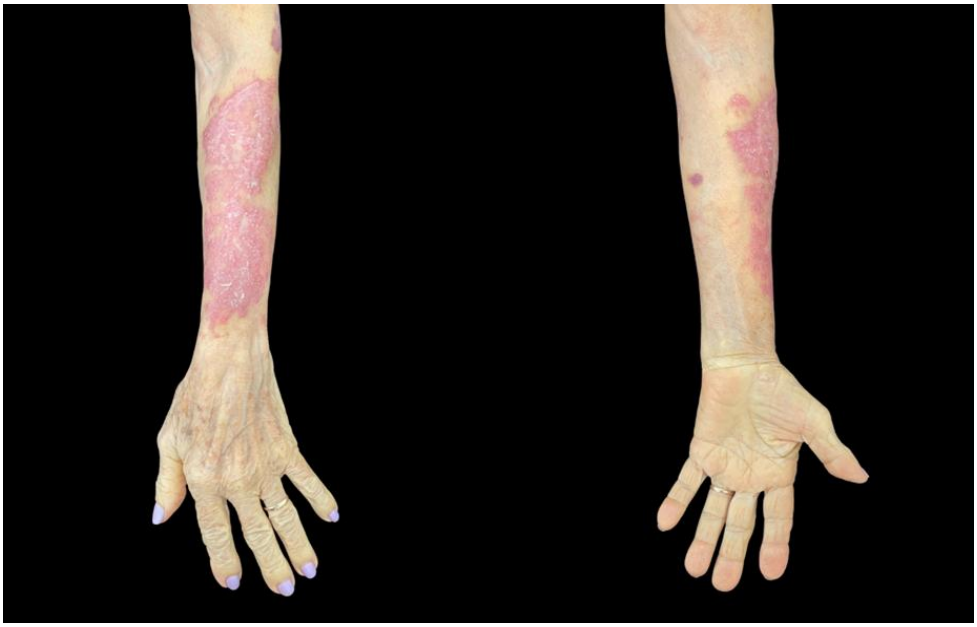

Figure 1: Erythematous-infiltrated, papulopustular plaque located on the anterior and posterior surface of the left forearm.

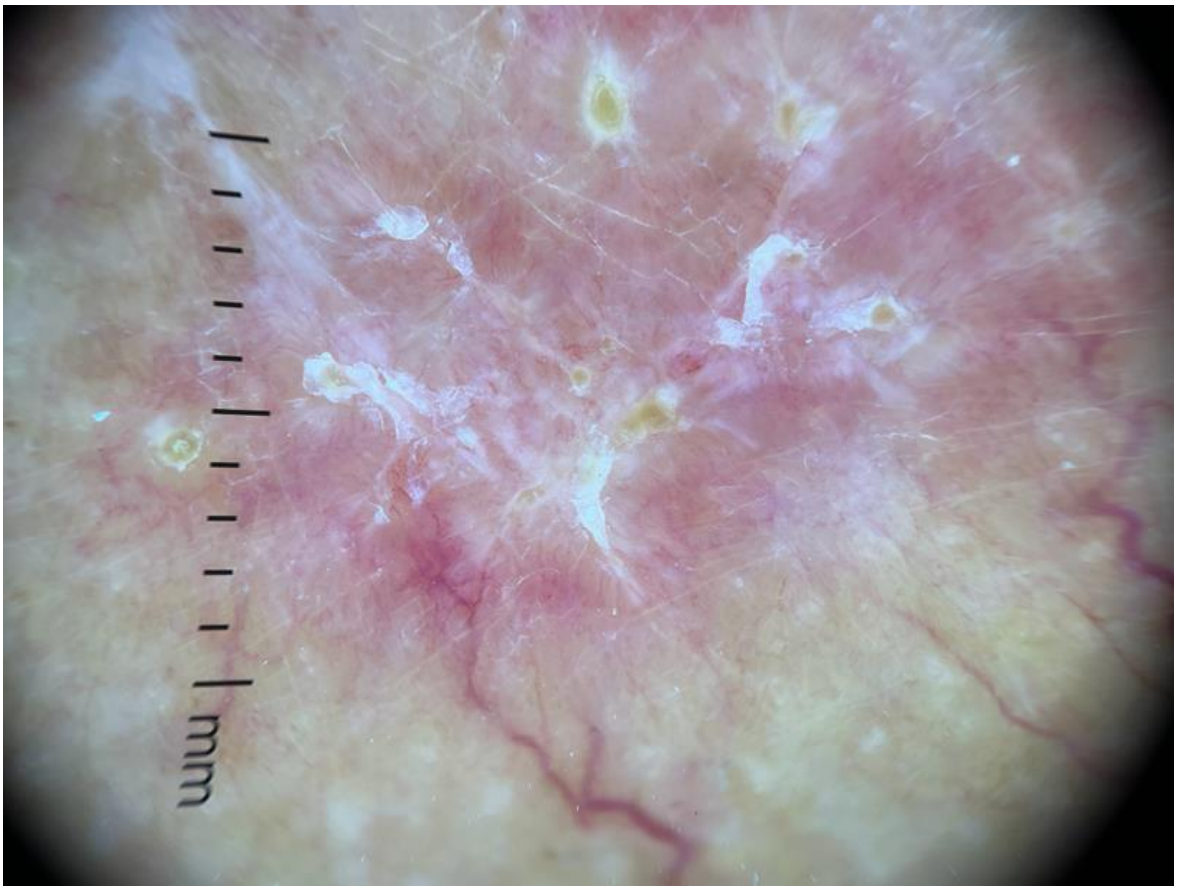

Figure 2: Dermoscopic findings (DL4 - dermlite).

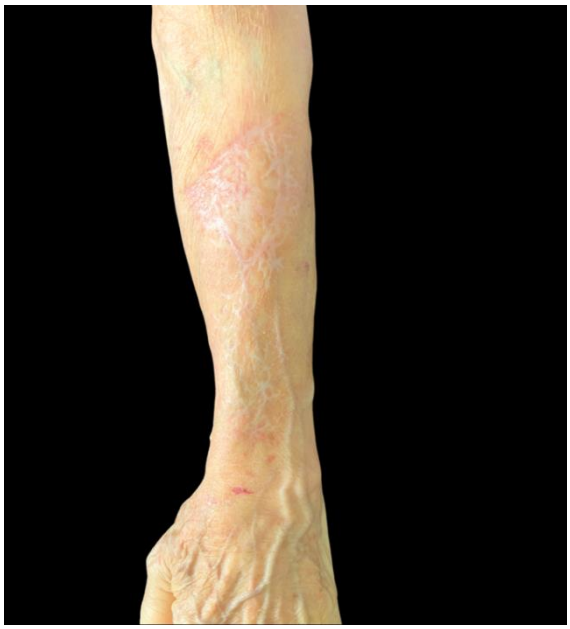

Figure 3: After treatment with itraconazole 100 mg twice daily.

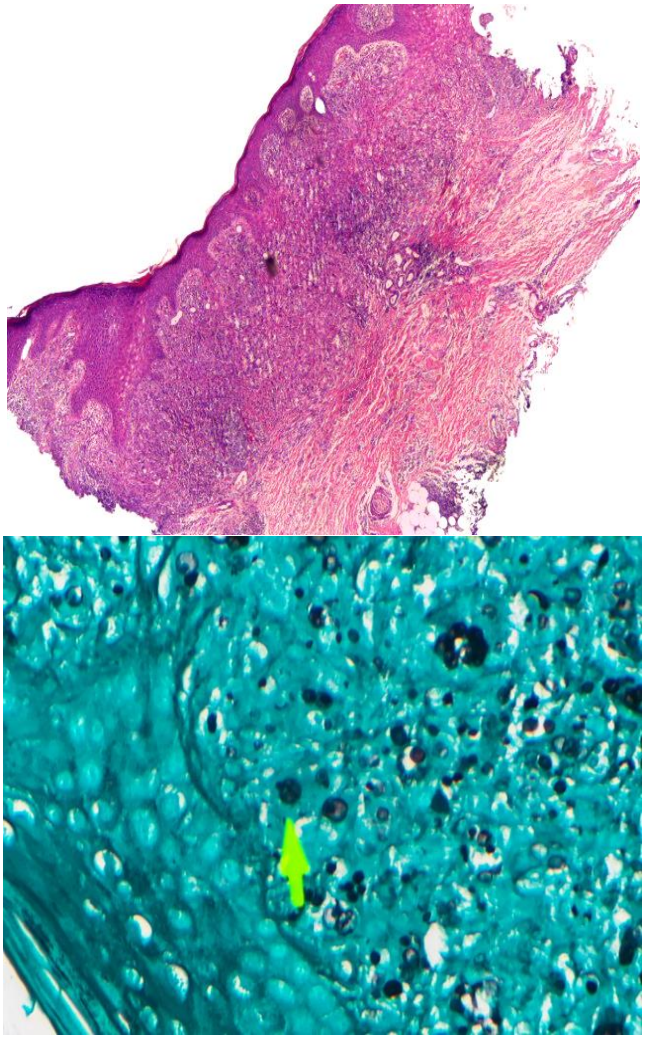

Figure 4: a) Granulomatous inflammation and abundant presence of microorganisms (HE, 400x); b) Structure resembling morulae, corresponding to the presence of an alga (Grocott, green arrow).

Discussion

Protothecosis is a disease with a high potential for underreporting and misdiagnosis due to the rarity of the infection and clinical similarities with various other dermatoses. This disease presents a broad spectrum of clinical presentations, including severe systemic forms, ranging from a single erythematous plaque to extensive tumors and subcutaneous nodules. The patient in the study contracted the algae at the forearm level, one of the areas of disease onset described in the scientific literature, due to the ease of trauma and entry point. Differential diagnoses to consider include deep mycoses, malignant neoplasms, eczema, atrophic keratosis pilaris, anetoderma, vermiculate atrophoderma, herpesvirus infections, and pyoderma gangrenosum [1,3,4].

Histological characteristics of the lesions include granulomatous inflammation with giant cells, histiocytes, lymphocytes, plasma cells, and abundant presence of microorganisms [5,6]. The algae appear as spherules ranging from 3 to 30 mm with 2 to 20 endospores inside, some resembling morulae, with a central endospore surrounded by several endospores [7]. Such findings were observed in the described case and were crucial in directing us towards the diagnosis. Therapy for protothecosis treatment is still uncertain, with studies showing better results when combining drug techniques with surgical techniques. Localized forms respond well to the use of topical imidazole derivatives combined with surgery for excision of residual lesions [1,2]. However, for extensive lesions, oral itraconazole is preferred at a dose of 200-400 mg per day, which may be associated with intravenous amphotericin B [1,2,4]. The patient in this study had involvement of the entire left forearm, and oral itraconazole monotherapy was chosen, resulting in an excellent therapeutic response.

Conclusion

Thus, the role of the dermatologist in considering this diagnosis when managing patients with lesions of atypical evolution after a history of trauma is emphasized.

Conflicts of Interests

The authors declare no conflict of interest for this paper.

Informed Consent

Informed consent was obtained from all subjects involved in the study.

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