Cutaneous protothecosis - Case report*

Prototecose cutânea - Relato de caso

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Abstract: Cutaneous protothecosis is a rare infection caused by achlorophyllic algae of the genus Prototheca. The lesions usually occur on exposed areas, related with trauma, in immunocompromised patients. The most common clinical presentation is a vesicobullous and ulcerative lesion with pustules and scabs, simulating bacterial, fungal or herpetic infections or eczema. The diagnosis is determined by agent identification through histopathology, culture and the carbohydrates assimilation test. The finding of morula-like spherules is characteristic of *Prototheca sp*. Its rarity and non-specific clinical aspect may difficult the disease diagnosis. We report a case of a diabetic patient, in chronic use of systemic corticosteroids, that developed a skin lesion after trauma to the right leg.
Keywords: Harmful algal bloom; Immune tolerance; Opportunistic infections; Seaweed; Skin diseases, parasitic

Resumo: A prototecose cutânea é uma infecção rara causada por algas aclorofílicas do gênero Prototheca. Geralmente as lesões ocorrem em áreas expostas, relacionadas à trauma, em indivíduos imunocomprometidos. A apresentação clínica mais comum é uma lesão vesico-bolhosa e ulcerativa com pústulas e crostas, simulando piodermites, infecções fúngicas, infecções herpéticas ou eczemas. O diagnóstico é realizado pela identificação do agente através do exame histopatológico, da cultura e do teste de assimilação dos carboidratos. O achado de esférulas com aspecto de mórula são características da *Prototheca sp*. A raridade da doença e o aspecto clínico inespecífico dificultam o diagnóstico da doença. Relatamos um caso em paciente diabética, em uso crônico de corticoide sistêmico, que desenvolveu lesão cutânea após trauma na perna direita.
Palavras-chave: Alga marinha; Dermatopatias parasitárias; Infecções oportunistas; Proliferação nociva de algas; Tolerância imunológica

INTRODUCTION

Protothecosis is a rare infection caused by achlorophyllic algae of the genus *Prototheca*.[1] They are mainly found in the environment, in the soil, fresh and salted water, mud of trees, sewage, animal waste and in some types of food.[2,3] They can colonize the skin and nails.[1] There are 3 clinical forms: cutaneous, olecranon bursitis and systemic.[1] The cutaneous form is the most common, and most infections are caused by *P. wickerhamii*, in immunocompromised patients.[4,5] The lesions usually occur on exposed areas, related with trauma.[1] There are 77 cases of cutaneous protothecosis described in the literature, 6 of them published by Brazilian authors.[1,6] We report the case of a diabetes mellitus type II patient in chronic use of systemic corticosteroids for allergic rhinitis, that developed a skin lesion after trauma to the right leg.

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CASE REPORT

A 61-year-old white woman, housewife by occupation, born in the state of Rio de Janeiro and raised in Araruama, a coastal city in an oceanic lakes region, reported the appearance of an erythematous and painful lesion in the right leg. It had developed 15 days before on an excoriation caused by local trauma that occurred during hospitalization for investigation of muscle weakness in the arms and legs. She was treated with cephalexin 500mg, four times a day, for a week, without improvement of the lesion and was referred to the dermatology service. Her medical history disclosed hypertension and allergic rhinitis in prolonged treatment with systemic corticosteroids in anti-inflammatory doses, since the age of 14-year-old (in the last year, intramuscular injections of betamethasone 7mg/week). During hospitalization, a motor and sensory neuropathy and type II diabetes mellitus were diagnosed and the treatment with metformin 850mg, 3 times a day, was started, with control of glucose blood level. The patient was discharged and the investigation of skin lesions continued in the dermatology service.

Dermatological examination revealed an erythematous, tender and painful plaque covered by pustules and scabs on the right leg (Figure 1).

The clinical picture suggested the diagnosis of erysipela, staphylococcal folliculitis, dermatophytosis and sporotrichosis.

Hematologic and biochemical laboratory findings were normal, except for high glucose levels (150mg/dL) before the introduction of metformin. HIV and hepatitis tests were negative.

A swab was collected from the pustules in addition to biopsy of the lesion. Cultures from the swab were performed for bacteria and fungi and were negative or both. Fifteen days after sowing, the cultures on Sabouraud dextrose agar and blood agar, developed white, creamy, yeast-like colonies (Figure 2). Culture microscopy showed sporangiospores within the sporangia, with morula-like aspect, consistent with *Prototheca sp*.

Histopathology revealed a suppurative and granulomatous inflammation in the dermis. The periodic acid-Schiff stain (PAS) revealed morula-like structures in the suppurative area (Figure 3). The same structures were colored in black by the Grocott silver stain (Figure 4).

For species identification, a suspension of the culture was submitted to the carbohydrate assimilation test by the Vitek automated system, indicating *P. wickerhamii* as the causative species.

After the diagnosis of cutaneous protothecosis, treatment was started with itraconazole at a dose of 200 mg daily for 3 months with complete healing of the lesion.

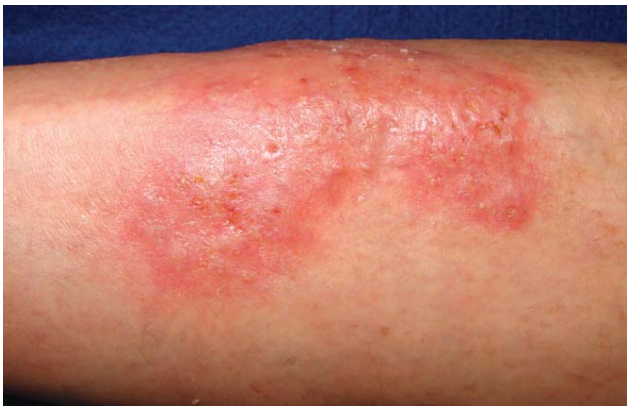

Figure 1: Erythematous plaque covered by pustules and scabs, on the right leg

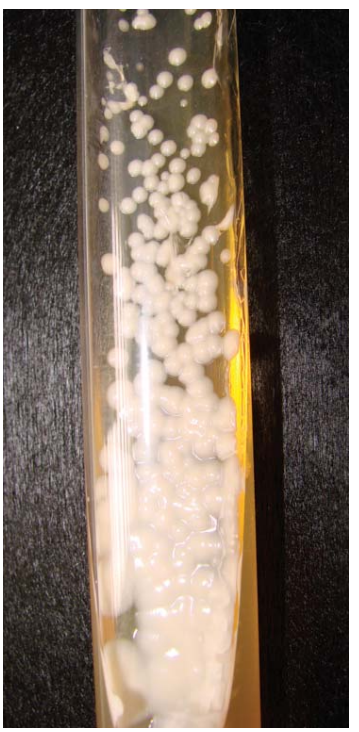

Figure 2: White, creamy, yeast-like colonies on Sabouraud dextrose agar

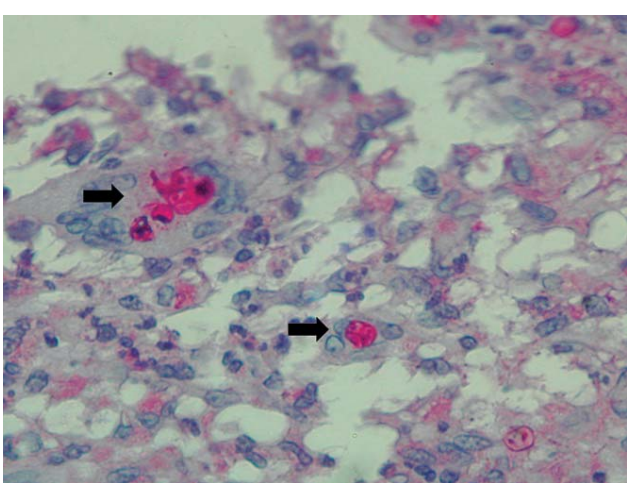

Figure 3: Histopathology revealed morula-like structures (arrows), typical of Prototheca sp., colored in red by PAS. (X400)

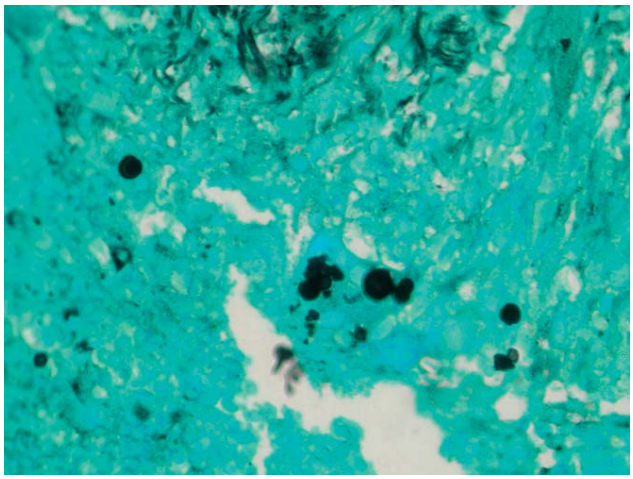

Figure 4: Histopathology showing Prototheca sp. structures, colored in black, by Grocott silver stain. (X400)

DISCUSSION

The first human protothecosis case was described by Davies and colleagues in 1964.[7] Clinically the infection can present three forms: cutaneous, olecranon bursitis and systemic protothecosis.[8] Up to now, 117 cases of protothecosis were reported.[1] 77 of those cases were of the cutaneous form, and 6 were described by Brazilian authors.[1,6]

It mainly affects immunocompromised patients. Risk factors include prolonged use of steroids, malignancies, diabetes mellitus, AIDS, organ transplantation and surgeries.[1]

The cutaneous infection is the most frequent clinical form.[1] It occurs on exposed areas, mainly on the extremities and face.[9] Sometimes it can be associated with trauma.[5,8] The most common presentation is vesiculobullous and ulcerative lesion with purulent discharge and crusting. However, other forms have been described: erythematous plaques, pustules, papules, nodules, verrucous lesions, hypopigmented or atrophic lesions.[1] Differential diagnosis includes bacterial infections, fungal infections, herpes simplex virus infections and eczema.[1,3,4,5,9,10]

Diagnosis depends on morphological identification of the organisms through histology, culture and carbohydrate assimilation test.[1,2,8,10] Sporangiospores within the sporangia forms a morula-like structure typical of *Prototheca sp*.[1,3]

Many treatment regimens have been attempted, but there has been no consistency in the clinical response.[1,8] Azole antifungals such as ketoconazole, fluconazole and mainly itraconazole are used for localized infections.[5] Amphotericin B is the most effective drug against protothecosis and is reserved for disseminated and visceral infections.[5] For localized cutaneous forms, surgical debridement or excision can be employed.[4]

The rarity and nonspecific clinical appearance of protothecosis complicate the differential diagnosis with other skin infections and disorders, reinforcing the importance of the etiologic agent research.❑

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