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Deep dermatophytosis in an immunocompetent adult with no prior history of skin disease

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ABSTRACT

The clinical presentation of invasive dermatophytosis often mimics other more common skin diseases. We report a case of severe deep dermatophytosis caused by *Trichophyton mentagrophytes* initially interpreted as herpetiform rash. The diagnosis was established based on fungal culturing and molecular detection using RT-PCR in addition to response to treatment using oral terbinafine. Our case emphasizes the importance of fungal testing at an early point to accelerate diagnosis and initiation of correct treatment.

1. Introduction

Invasive dermatophytosis is an uncommon presentation of dermatophyte infection [1] and the clinical presentation can be similar to other skin diseases. Increased awareness of dermatophytosis as a differential diagnosis is needed to ensure early diagnosis and correct treatment of such infections. Here, we report a case of severe deep dermatophytosis caused by the zoophilic dermatophyte *Trichophyton mentagrophytes* (*T. mentagrophytes*).

2. Case presentation

A healthy 36-year-old male presented at day 0 with a painful rash in the femoral and genital region developing over one week. He had no prior history of travelling, no suspicion of sexually transmitted diseases, and had not taken any medication prior to the development of the rash. He lived with his family and a dog and two cats in addition to one rabbit living outside the house.

Initial physical examination revealed an encrusted lesion in the right genital area of approximately 12 cm in diameter (Fig. 1A and B) as well as several well-defined elevated reddish lesions of approximately 2–4 cm in diameter on both upper thighs. Some of these with central vesicles (Fig. 1B). Our initial suspicion was herpetiform rash based on the clinical presentation. However, real-time polymerase chain reaction (RT-PCR) analyses for herpes simplex and varicella zoster viruses performed at day 0 were negative. Other differential diagnoses included Sweet syndrome and skin infection. Blood analyses taken at day 0 revealed elevated C-reactive protein (60.8 mg/l) and white blood cell count (12.4 x 10^9/l). Screening of liver and kidney parameters were normal. Screening for human immunodeficiency virus (HIV) was negative. The patient was hospitalized at day 0 because of severe pain in the affected area, and was initially treated with iv. Valaciclovir (7 days in total) due to the suspicion of herpes virus infection in addition to topical steroids with clioquinol. The treatment was supplemented by oral antibiotics and analgesics.

Microbiological assessment included examination of skin scrapes from the thigh, groin and genital regions taken at day +4 and day +8. PCR for dermatophytes from these regions showed *Trichophyton interdigitale/mentagrophytes*, but further differentiation between the two species was initially not possible. Blanchophor microscopy showed septate hyphae, but no spores. At day +13, after incubation on a Sabouraud glucose agar, macroscopic evaluation showed flat, cream-colored colonies with a powdery surface and reverse brown pigmentation. Microscopy revealed septate hyphae, round microconidia in clusters and spiral hyphae consistent with *T. mentagrophytes*. PCR (DermaGenius® (PathoNostics)) for dermatophytes was performed from the colony confirming the species diagnosis of *T. mentagrophytes*. Antifungal susceptibility testing was performed in microtiter plates according to the EUCAST method E. Def 11.0 for antifungal susceptibility testing of microconidia-forming dermatophytes [2], and the isolate was interpreted as susceptible for terbinafine (MIC 0.016 mg/L) and itraconazole (MIC 0.032 mg/L). No other probable pathogen was identified

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in repeated skin cultures.

Histopathological examination of two skin biopsies taken at day +2 revealed epidermal acanthosis and spongiosis with infiltration of neutrophile granulocytes. Perivascular infiltration of lymphocytes and neutrophiles was seen in superficial dermal layers while dense inflammatory infiltration with neutrophile granulocytes, lymphocytes and dispersed eosinophiles was observed in relation to the remains of follicular epithelia in deep dermal layers. The overall conclusion was deep, acute folliculitis with abscessation. Histological examination included periodic acid-Schiff (PAS) staining for fungi and immunohistochemical staining for herpes but was unable to find the cause of folliculitis. The findings were not compatible with Sweet's syndrome.

Our patient started treatment with oral terbinafine 250 mg per day at day +8 and continued for three months. The treatment was supplemented by topical terbinafine and 20 mg oral prednisolone daily which was slowly phased out over four weeks. Oral prednisolone was initially started before the diagnosis of dermatophytosis due to suspicion of Sweet syndrome. Because of the anti-inflammatory effect, it was continued after confirmation of dermatophytosis. This resulted in pain reduction and gradual healing of the affected areas with subsequent mild scarring and post-inflammatory hyperpigmentation. Three months after hospitalization upon cessation of antifungal treatment, the patient had not experienced any recurrence of symptoms or lesions (Fig. 1C and D).

3. Discussion

In recent years an increased frequency of dermatomycosis has been reported [3]. However, the initial clinical presentation can easily be interpreted as other more common skin diseases.

In order to differentiate between different types of deep dermatophytosis, the importance of the histopathological diagnosis is often accentuated [4,5]. In our case however, histopathological examination showed acute folliculitis with abscessation but fungal elements were not identified. Microbiological examination of several skin specimens revealed *T. mentagrophytes* as the causative pathogen and the clinical presentation together with the immediate clinical response to antifungal treatment supported the suspicion of deep dermatophytosis. The exact type of deep dermatophytosis was not established by histopathological examination in our case. Nonetheless, our findings were compatible with Majocchi's granuloma (MG) which is a type of invasive dermatophytosis characterized by perifollicular granulomatous infiltration of the dermal skin layer [4]. In recent years, MG has been described in both immunocompetent and immunocompromised individuals with *Trichophyton rubrum (T. rubrum)* being the most commonly isolated pathogen [4,6].

The isolated pathogen in our case was the dermatophyte *T. mentagrophytes*. This zoophilic dermatophyte has been isolated from a variety of animals including rodents, rabbits, cats, horses and sheep [7]. Hence, it seems likely that our patient was infected through the family's domestic animals though we have no knowledge of these animals being examined. The most frequently isolated dermatophyte in MG is *T. rubrum* while a number of other dermatophytes including *T. mentagrophytes*, *T. interdigitale* and *T. tonsurans* have been reported as well [4]. Invasive dermatophytosis requires systemic treatment and terbinafine is recommended as first line treatment [5]. However, there are increasing reports of terbinafine resistance in *Trichophyton* isolates [8] highlighting the need for susceptibility testing in severe dermatomycoses or cases with treatment failure. EUCAST has recently published a standardized protocol for susceptibility testing of dermatophytes [2]. Our patient started empiric treatment with oral and topical terbinafine based on the initial identification of *T. interdigitale/mentagrophytes* and

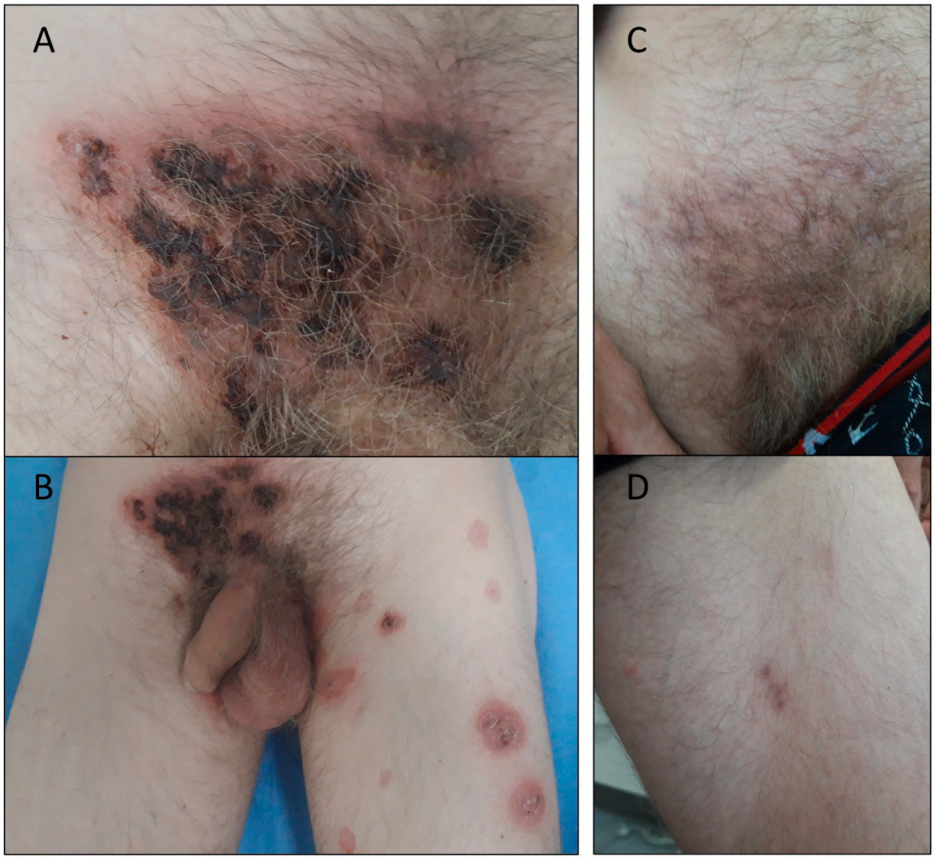

Fig. 1. A–B: Clinical presentation at diagnosis. C–D: Clinical presentation at 3-months follow-up (day 90), just after ending antifungal treatment.

subsequent testing showed susceptibility to this drug.

Previously identified predisposing factors to development of invasive dermatophytosis are immunosuppression including use of local steroid, chronic dermatophytosis, skin barrier defects, shaving, sexual contact and contact with animals [4]. While deeper dermatophytosis is seen primarily in immunocompromised patients, MG has been reported in both immunocompromised and immunocompetent patients [4,5]. The family had domestic animals, but no other known predisposing factor could be identified in our case. However, the patient was a diligent runner and we speculate that the combination of moist and repeated friction in the inguinal area during workouts could predispose to development of skin diseases including invasive dermatophytosis in an otherwise healthy individual.

We report this case to increase awareness of fungal infections as a differential diagnosis to severe skin lesions in immunocompetent individuals and underline the importance of specific fungal testing at an early point to accelerate diagnosis and initiation of correct treatment to prevent permanent scarring.

Conflict of interest

There are none.

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