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CASE REPORT/CAS CLINIQUE

Tinea manuum due to *Trichophyton erinacei* from Tunisia

Dermatophytie de la main causée par Trichophyton erinacei

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KEYWORDS
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Erythematous lesion

Summary *Trichophyton erinacei* is a zoonotic fungus affecting hedgehogs. Although several human infections with this organism have been documented in the literature, it has rarely been isolated as a human pathogen. This paper reports on an erythematous lesion spotted on the hand of a 10-year-old girl. Based on the culture of the patient's skin scrapings, the pathogen was mycologically identified as *T. erinacei*, which was further confirmed by sequencing the internal transcribed spacers of the fungal nuclear ribosomal DNA using universal primer ITS1-ITS4. This is the first case of *T. erinacei* in a Tunisian patient. A survey was carried out on the environment of our patient, and the results revealed the presence of hedgehogs with suspect scaly lesions. The same fungus was isolated from the hair and scales of the hedgehog, which was confirmed by PCR sequencing. The frequency of *T. erinacei* has often been underestimated, which is attributed not only to the gaps of knowledge still existing in the current understanding of the dermatophyte but also to differential diagnosis problems. Molecular study offers a simple and rapid tool to identify the source of infection and, hence, avoid the risk of recurrence.

MOTS CLÉS
Dermatophytie circiné ;
Trichophyton erinacei ;

Résumé *Trichophyton erinacei* est un dermatophyte zoophile, retrouvé de façon naturelle chez le hérisson. Il est rarement impliqué en pathologie humaine. Nous rapportons le premier cas tunisien. Il s'agit d'une jeune fille âgée de 10 ans, qui a consulté pour une lésion érythémateuse au niveau de la main droite. L'examen direct et la culture des squames ont montré qu'il s'agissait

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ADNr ;
TmF-TmR ;
Lésion érythémateuse

de *T. erinacei*. La PCR séquençage des régions ITS de l'ADNr a confirmé l'identification phénotypique en utilisant l'amorce universelle ITS1-ITS4. Une enquête menée dans l'entourage de notre patiente a révélé la présence des hérissons dont un était atteint par des lésions squameuses. Enfin, les prélèvements mycologiques des squames et des poils effectués sur cet animal ont permis d'isoler le même dermatophyte. Une PCR séquençage a confirmé l'origine de contamination par ce champignon. La fréquence de *T. erinacei* est surement sous-estimée, expliquée non seulement par une méconnaissance de ce dermatophyte pour un problème de diagnostic différentiel mais aussi par la fréquence des hérissons dans notre environnement. L'étude moléculaire est un outil simple et rapide pour l'identification de la source d'infection afin d'éviter le risque de récidive.

Introduction

Trichophyton erinacei is a member of the *Trichophyton mentagrophytes* complex. Although it has traditionally been considered as a variant of *T. mentagrophytes*, recent research indicates that its distinct morphological and physiological characteristics justify its classification as a separate species [7]. The need for this taxonomic revision has further been confirmed by findings from molecular phylogeny [5].

T. erinacei is a zoonotic dermatophyte commonly associated with hedgehogs and known to cause superficial skin infections by invading and parasitizing non-living keratinized layers. Although the number of human infections by this zoophilic fungus has been reported to increase worldwide, only few research studies have reported on its isolation as a human pathogen [11]. The present study reports on the first case of human infection caused by *T. erinacei* in Tunisia.

Patients and methods

On May 2012, a 10-year-old healthy girl presenting a complaint of an itchy lesion of the right hand for 15 days was admitted to the hospital of Habib Bourguiba, Sfax, Tunisia. She had erythematous patches with active margins and fine yellowish scales on her hand (Fig. 1). The patient had neither other injuries on the rest of her body nor documented family history of dermatophytosis. Diagnosis was based on direct mycological examination and culture. For direct microscopic examination, scales and hair were soaked in 30% of potassium hydroxide (KOH). Culture was performed on Sabouraud glucose agar with chloramphenicol (CAF) and cycloheximide. After incubation at 29 °C for 2 weeks, dermatophytes were identified on the basis of macro- and microscopic characters of the grown colonies.

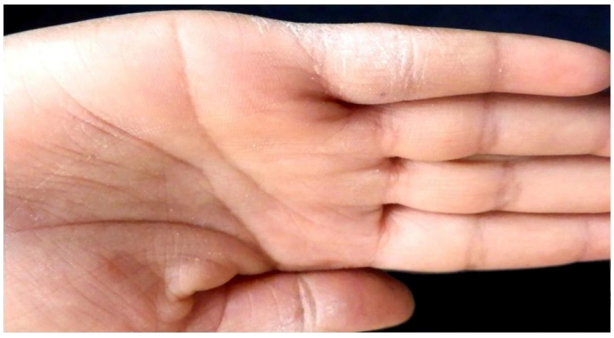

Figure 1 Erythemic scaly lesion of the right hand due to *T. erinacei*.
Lésion squameuse érythémateuse de la main droite due à T. erinacei.

Results

The microscopic examination of scales from the lesions showed the presence of septate hyaline hyphae. The direct examination of the hair did not show parasitism. Three weeks later, the hair culture remained negative, but the culture of infected skin scales revealed white fungal colonies with a powdery-to-cottony surface (Fig. 2a) and a bright lemon-yellow reverse surface (Fig. 2b). Microscopy revealed several round to pear-shaped microconidia along the sides of the mycelium. Macroconidia were few, septate, and irregular in shape and size. No spiral bodies were observed (Fig. 2c). Furthermore, a urease test was performed and yielded positive results. Overall, these characteristics indicated that the fungus could be identified as a *T. erinacei*. To confirm the diagnosis, a molecular study was performed by sequencing the internal transcribed spacer regions of the ribosomal DNA with primer sets ITS1 and ITS4. The consensus sequence showed 99% similarity with *T. erinacei*, type strain JN134091.1. Two months later, the skin lesions were successfully treated with topical econazole nitrate (2 applications/day for 30 days).

A survey was conducted on the place and surrounding environment where the patient under investigation lived to identify potential sources of contamination or nests of infection. The survey revealed the presence of several hedgehogs identified as *Atelerix albiventris* [4]. One among these hedgehogs showed scaly lesions in the nose (Fig. 3a) and loss of dorsal quills (Fig. 3b).

DNA extraction was performed directly from the skin flakes of the animal, followed by PCR sequencing with specific primers (Tm-F and Tm-R). The alignment of the consensus sequence with those in Gene-Bank showed a 100% identity mach with *T. erinacei*. The sequences of the DNA extracted from the patient and the one from the hedgehog showed 99% homology. Accordingly, the results provided strong support for the conclusion that the hedgehog was the source of patient infection. The consensus sequences