

Subcutaneous abscesses caused by *Trichophyton rubrum* in the unilateral groin of an immunocompromised patient: A case report

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ABSTRACT

A 60-year-old Japanese man presented with multiple subcutaneous nodules in his left groin. Histologically, the nodules consisted of suppurative granulomas and abscesses not involving the hair follicles. *Trichophyton rubrum* TWCC57922 was detected by fungal culture and polymerase chain reaction (PCR) sequencing of the rDNA genes. We diagnosed these nodules as deeper dermal dermatophytosis, a rare form of invasive dermatophytosis. He was treated with terbinafine. We compared these findings with previous reports of deep dermal dermatophytosis.

1. Introduction

Dermatophytes usually infect the keratinized layers of the epidermis, hair follicles, and nails. In rare cases, dermatophytes proliferate in the deep dermis and subcutaneous tissues. Although there is no specific classification for invasive dermatophytosis, it could be divided into three forms: Majocchi's granuloma, deeper dermal dermatophytosis, and disseminated dermatophytosis [1]. Deeper dermal dermatophytosis is rare and presents with subcutaneous granulomas or abscesses, with or without the involvement of hair follicles. We describe the case of an immunocompromised patient with multiple subcutaneous abscesses in the left groin caused by *Trichophyton rubrum*, and treated with terbinafine.

2. Case

A 60-year-old Japanese man developed a subcutaneous nodule in his left groin on day – 169 and visited our department on day – 147. We performed an incision and drainage of the nodule, which evacuated yellowish-colored, purulent material. Bacterial cultures on blood agar (POURMEDIA; horse, Eiken Chemical, Tokyo, Japan) and Bromthymol Blue (BTB) lactose agar (POURMEDIA Modified DRIGALSKI Agar; Eiken Chemical, Tokyo, Japan), and fungal cultures on M Green Yeast and Mold medium (MGYM) agar (Kyokuto, Tokyo, Japan) were all negative. The wound healed in 1 month. Around day – 90, the patient noticed

that the nodule had returned. It gradually enlarged, and other nodules began to appear around the same site. He visited our department again on day 0.

He had been receiving 10 mg of prednisolone and 4 mg of tacrolimus for interstitial pneumonia associated with polymyositis for 10 years. He also had a history of psoriasis vulgaris.

The physical examination on day 0 revealed multiple well-demarcated, elastic, soft, mildly tender, subcutaneous nodules in the left groin measuring 10–20 mm (Fig. 1a). One of the nodules was fluctuant and subsequently evacuated yellow purulent material. No bacterial or fungal cultures were obtained at that time.

Laboratory tests revealed a white blood cell count of 12,170/μl (normal range, 3900–9800/μl), a C-reactive protein level of 0.79 mg/dl (< 0.30 mg/dl), and a beta-D-glucan level of 272 pg/ml (< 20.0 pg/ml). Multiple subcutaneous nodules were identified on a computed tomography (CT) scan (Fig. 1b).

We performed a partial excision of the nodules on day + 82. The histopathological examination showed a well-demarcated nodule comprising multiple abscesses and suppurative granulomas with fibrous septae (Fig. 2a). The suppurative granulomas consisted of a large number of neutrophils surrounded by histiocytes and giant cells (Fig. 2b). There were many spore chains and septate hyphae in the abscesses and granulomas, which were more obvious in the Grocott-stained section (Fig. 2c).

We changed the MGYM agar to BD BBL™ Sabouraud Dextrose Agar

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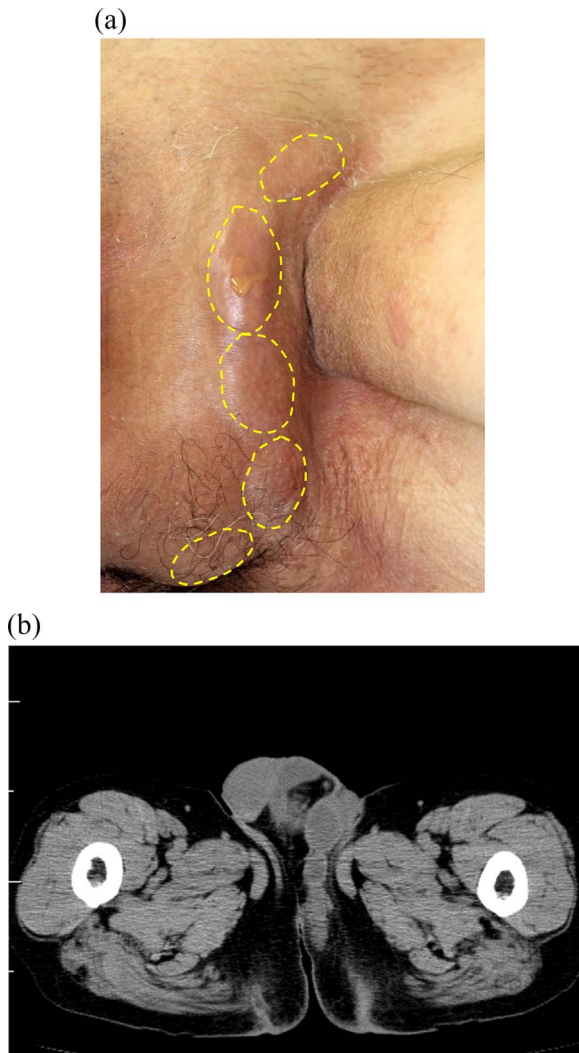


Fig. 1. Clinical and radiographic pictures of skin lesions. (a) Multiple elastic, soft, subcutaneous nodules in the left groin. (b) Multiple subcutaneous nodules on a CT scan.

with Chloramphenicol and Gentamicin (Becton, Dickinson and Company, Japan), and the culture finally yielded a white, downy, yellowish reverse colony (Fig. 3a). The fungal organism was identified as *T. rubrum* TWCC57922 by polymerase chain reaction (PCR) sequencing of the ribosomal region spanning the internal transcribed spacers (ITS1 and ITS2) and the 5.8S rRNA following the protocol described by Hir-otsu et al. (Fig. 3b) [2]. The 604 bp of ITS1–5.8S rDNA-ITS2 region of TWCC 57992 was completely identical (100%) to that of each *T. rubrum* strain including the type strain CBS 392.58.

After the partial excision on day + 82, the nodules, which had been diminishing, began to gradually regrow around day + 300. The patient was started on a regimen of oral terbinafine 250 mg daily on day + 355, and the nodules were almost resolved after 3 months of therapy. He continued his treatment for a total of 6 months and did not be detected any nodules by a CT scan. There were no side effects during the treatment period.

3. Discussion

Dermatophytosis usually affects the stratum corneum, the hair follicles, and the nails. Deeper dermatophytosis that invades the deep dermis or subcutis is rarely seen. Although there are no specific classifications for invasive dermatophytosis, Marconi et al. have classified this condition into three forms: Majocchi's granuloma, deeper dermal

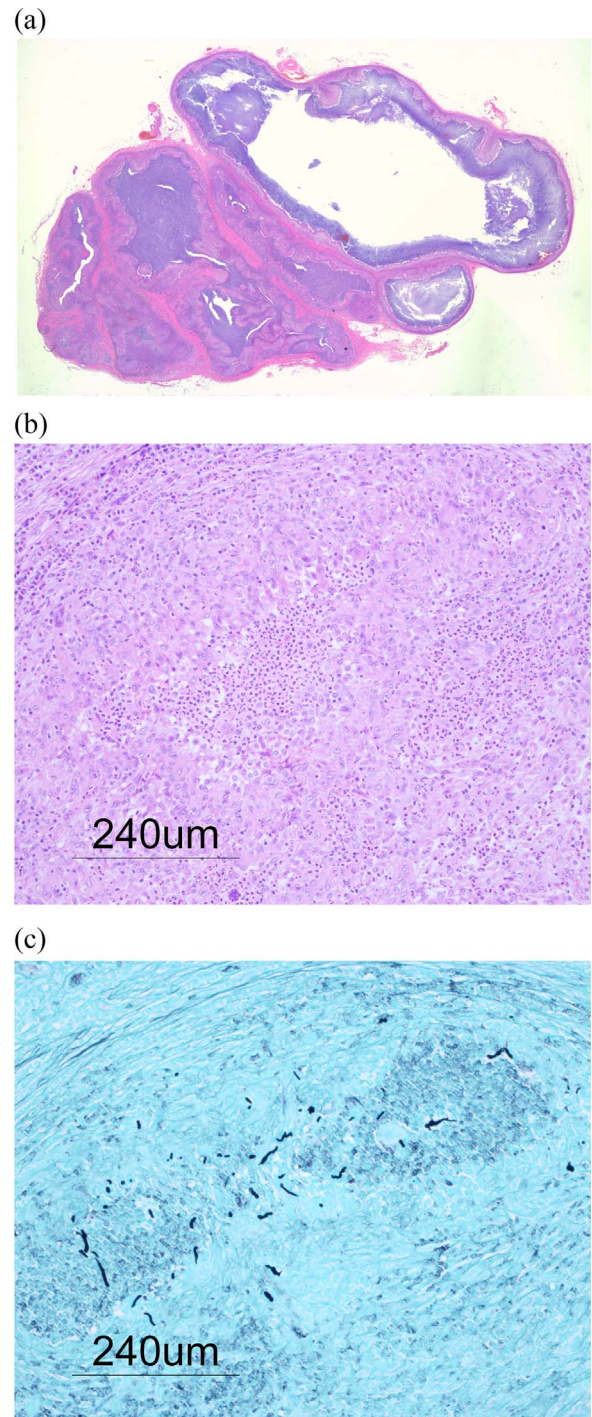


Fig. 2. Histopathology of the surgical specimen. (a) The nodule composed of abscesses and granulomas with fibrous septae. (Hematoxylin-eosin stain; loupe) (b) The suppurative granuloma consisted of neutrophils surrounded by histiocytes and giant cells. (H&E; original magnification: X100.) (c) Spore chains and septate hyphae in the granuloma. (Grocott stain; original magnification: X100).

dermatophytosis, and disseminated dermatophytosis [1]. Majocchi's granuloma is the most common form, in which dermatophytes proliferate in the dermis through the hair follicles to form granulomas [3]. Deeper dermal dermatophytosis is rarer and is detected as an abscess, a suppurative granuloma, or a pseudocyst, with or without the involvement of hair follicles. Disseminated dermatophytosis can involve various skin sites and internal organs.

We diagnosed this patient as having deeper dermal dermatophytosis because he presented with subcutaneous abscesses and suppurative

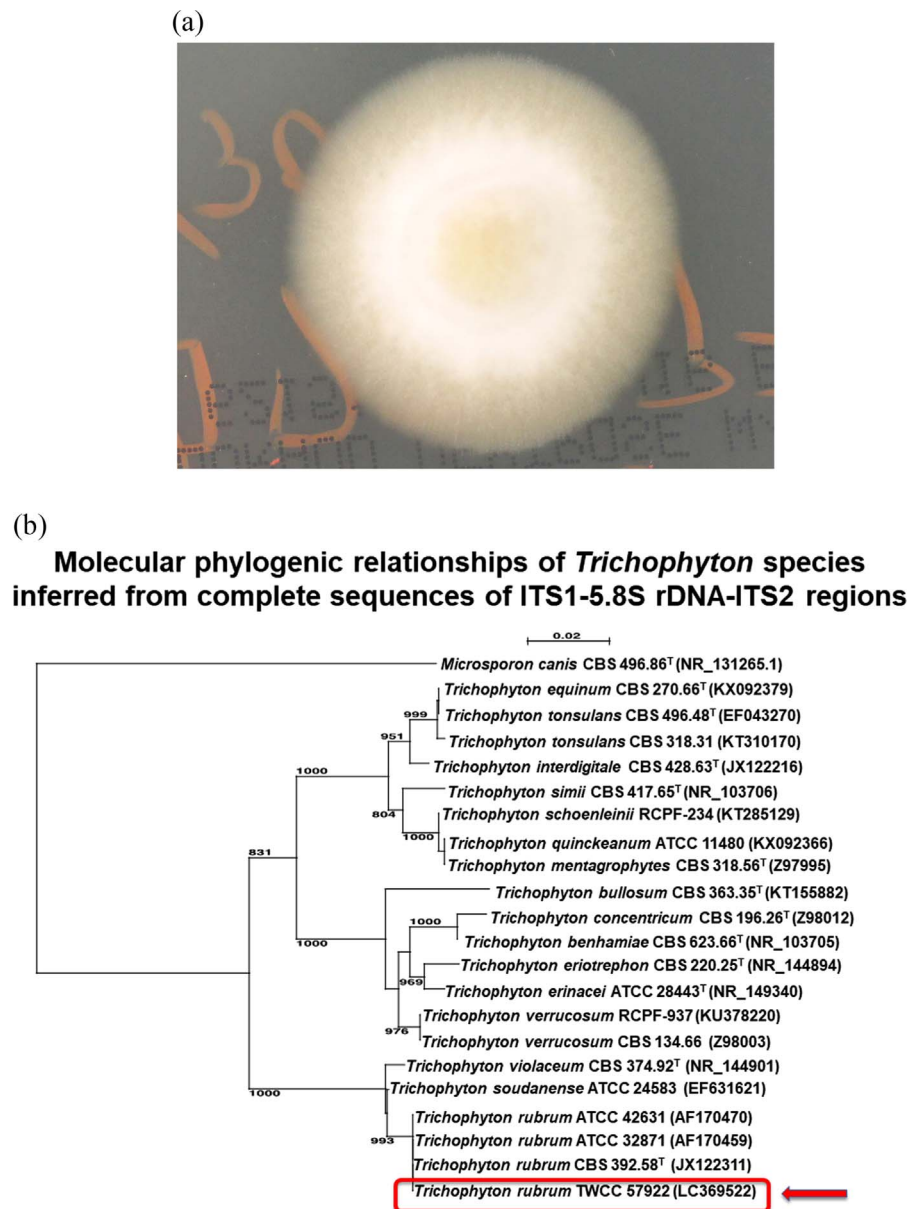


Fig. 3. The fungal culture and PCR sequencing of the ribosomal region. (a) A white, downy colony on Sabouraud Dextrose Agar with Chloramphenicol and Gentamicin. (b) The fungal organism was identified as *T. rubrum* TWCC57922 by PCR sequencing.

granulomas without hair follicle involvement. The nodules grew in the lateral aspect of the groin resembling a lymphadenitis pattern, but no lymphoid tissue was seen on the histopathological examination. No other organs or lymph node sites were affected. To the best of our knowledge, this is the first report of deeper dermal dermatophytosis that mimicked lymphadenitis. We suspected that the patient's immunocompromised status, in conjunction with our decision to incise the initial abscess, would have allowed fungal proliferation and led to the development of multiple abscesses in his groin.

According to the reports of 48 cases of deeper dermal dermatophytosis between 1966 and 2017 [4–7], 39 cases (81%) occurred in immunocompromised patients. The lesions most frequently affected the lower extremities, including the buttocks and groin ($n = 27$, 56%), although they could occur on any part of body. Deeper dermal dermatophytosis tends to present with multiple nodules rather than solitary ones, and the patients frequently also have superficial dermatophytosis. The most common pathogen for deeper dermal dermatophytosis is *T. rubrum* ($n = 39$, 81%), but other pathogens include *T. violaceum*, *T. mentagrophytes*, *Microsporion canis*, *M. ferrugineum*, and *T. verrucosum*.

An elevation of beta-D glucan was noted, which may suggest the possibility of an invasive fungal infection. This has been reported in 7 cases (15%).

The standard treatment for deeper dermal dermatophytosis has not yet been established, but systemic antifungal therapy is generally selected [5,6]. Oral terbinafine or itraconazole would be effective. When the lesion forms a well-demarcated, subcutaneous nodule, the combination of resection and systemic antifungal therapy might be useful [7].

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Conflict of interest

None.

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