Dermatology Practical & Conceptual

Distal Nail Canal Visible on Onychoscopy as a Diagnostic Sign of Dermatophytoma

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ABSTRACT

Background: Early recognition of dermatophytoma is essential to initiating appropriate therapy and avoiding treatment failure. Dermatophytoma is a variant of distal subungual onychomycosis, characterized by an accumulation of hyphae and scales trapped under the nail plate, making antifungal treatment challenging. Its hallmark feature is a yellow-white mass under the nail with a distal band of onycholysis or "canal".

Objectives: This study aimed to describe the clinical and onychoscopic features of dermatophytoma to improve diagnostic accuracy.

Methods: We conducted a retrospective study of 16 dermatophytoma cases diagnosed from 2020 to 2024 in a Nail Disorders Outpatient Clinic. Inclusion criteria were clinical and onychoscopic diagnosis, microbiological confirmation, and availability of dermoscopic images. Demographic, clinical, microbiological, and dermoscopic data were analyzed descriptively.

Results: Fifteen patients (with 16 dermatophytomas) were included (8 males, 7 females; mean age 67.9 ± 14.2 years). The big toe was most frequently affected (87.5%). Trichophyton rubrum was the predominant pathogen (94%). Onychoscopy revealed yellow discoloration in all cases, with multicolored lesions in 81.3%. Most lesions were oval (56%) or elongated (25%), with an average transverse diameter of 5.6 ± 2.9 mm. A characteristic distal "canal" of onycholysis was identified in all cases, most commonly linear or wavy.

Conclusions: Onychoscopy reveals specific features, particularly the presence of a canal, that can aid early diagnosis. Recognizing these features is essential to initiating combined antifungal and mechanical therapy to improve outcomes. Training clinicians to identify the canal sign may significantly enhance diagnostic accuracy and therapeutic success.

Introduction

Dermatophytoma is a variant of distal subungual onychomycosis (DSO) characterized by an accumulation of hyphae and scales that remain encased in a layer of biofilm under the nail plate. This makes penetration of systemic or topical antifungals, and thus therapeutic success, difficult [1-3]. Clinically, dermatophytoma is characterized by a dense yellow-white linear band ("spike") or a round area under the nail plate. The mass continues distally with a yellow-whitish band up to the free edge [4]. When the onycholytic plate is removed, a thick hyperkeratotic mass is found [5]. Recognizing dermatophytoma is therefore essential to proper patient management [3,6].

Objectives

We performed a retrospective study of cases of dermatophytoma, collected from 2020 to 2024 in the Nail Disorders Outpatient of the Department of Medical and Surgical Sciences (DIMEC), University of Bologna, Italy. This study aimed to describe the clinical and onychoscopic characteristics of dermatophytoma in our cohort to improve the diagnostic accuracy of this entity.

Methods

Patients who met the following criteria were included in the study: clinical and onychoscopic diagnosis of dermatophytoma, microbiological confirmation by mycotic culture positive for dermatophytes, and availability of high-resolution onychoscopic images for retrospective review. Patients with onychomycosis without evidence of dermatophytoma and patients with concomitant nail pathologies were excluded.

For each patient demographic data (sex, age at the time of diagnosis), clinical characteristics (anatomical site involved, number of nails affected), result of mycological examination with fungal species isolated, onychoscopic data (color, shape, and transverse diameter of the mass, presence and shape of the onycholytic band) were collected. The data were analyzed using descriptive methods, summarizing categorical variables as frequencies and percentages and continuous variables as the mean with standard deviation (SD).

Results

Fifteen patients were enrolled (Table 1). All patients presented with dermatophytoma of a single nail, except one patient presenting with dermatophytomas on two toes. No sex predominance was found (8 males and 7 females). The mean age at diagnosis was 67.9 ± 14.2 years. The big toe was the most frequently affected digit (N=14, 87.5%). *Trichophyton rubrum* was isolated in 15 cases (94%), while *Trichophyton interdigitalis* was identified in a single case involving the fifth toenail of the left foot.

On onychoscopy, we determined the color, shape of the mass, transverse diameter, presence and course of the canal (Figure 1). Yellow was the most represented color, present in all cases (N=16, 100%). Other colors found were white (N=7, 44%), brown (N=4, 25%), and orange (N=2, 13%). Multicolored dermatophytomas were observed in 13 cases (81.3%). The oval shape was the most frequent (N=9, 56%), followed by elongated (N=4, 25%), irregularly round (N=2, 13%), and quadrangular shapes (N=1, 6%). The average transverse diameter was 5.6 ± 2.9 mm (5.8 mm for the oval shape and 3 mm for the elongated shape). In all cases, a "canal" was evident by dermoscopy, namely the band of onycholysis reaching the free edge of the nail. The shape of the canal was straight linear (N=7, 44%), wavy linear (N=7, 44%), or curved (N=2, 12%).

Conclusions

Dermatophytomas are often underdiagnosed due to their co-presentation with other forms of onychomycosis, requiring increased awareness among dermatologists [4]. This single-center retrospective review of 16 cases of dermatophytoma adds to the literature by providing detailed clinical and onychoscopic data. The study results suggest that dermatophytoma has no sex preference and typically affects older adults, with the big toe being the most involved digit, but other toes may also be affected [6]. This suggests that anatomical and mechanical factors could play a role in pathogenesis. *Trichophyton rubrum* resulted the most common pathogen in dermatophytomas, as previously reported in literature [1]. Onychoscopic features included an oval or elongated area of a matte

Table 1. Clinical characteristics of patients and onychoscopy of dermatophytomas.

Patient N.	Sex	Age	Anatomical site	Culture	Color	Mass shape	Transverse diameter	Canal
1	F	73	1st toenail, right	+ *(T. rubrum)*	Yellowish	Irregularly round	3 mm	Present, curved
2	F	46	1st toenail, left	+ *(T. rubrum)*	Yellowish	Elongated shape	4 mm	Present, wavy linear
3	M	67	1st toenail, left	+ *(T. rubrum)*	Orange-yellowish	Oval	6 mm	Present, straight linear
4	M	71	1st toenail, left	+ *(T. rubrum)*	White-yellowish	Oval	6 mm	Present, wavy linear
5	F	69	1st toenail, right	+ *(T. rubrum)*	Yellow-brownish	Irregularly round	10 mm	Present, wavy linear
6	F	64	1st toenail, right	+ *(T. rubrum)*	White-yellowish	Elongated shape	2 mm	Present, straight linear
7	M	65	1st toenail, right	+ *(T. rubrum)*	Yellow-brownish	Oval	8 mm	Present, straight linear
8	F	46	1st toenail, right	+ *(T. rubrum)*	White-yellowish	Elongated shape	3 mm	Present, straight linear
9	M	58	1st toenail, left	+ *(T. rubrum)*	Yellowish	Oval	3 mm	Present, straight linear
10	M	86	1st toenail, left	+ *(T. rubrum)*	Orange-yellowish	Oval	7 mm	Present, curved
11	M	71	1st toenail, right	+ *(T. rubrum)*	Yellow-brownish	Oval	8 mm	Present, wavy linear
12	F	66	1st toenail, right	+ *(T. rubrum)*	White-yellowish	Elongated shape	3 mm	Present, wavy linear
			4th toenail, right	+ *(T. rubrum)*	White-yellowish	Oval	3 mm	Present, straight linear
13	M	95	1st toenail, right	+ *(T. rubrum)*	Yellow-brownish	Oval	7 mm	Present, wavy linear
14	M	88	5th toenail, left	+ *(T. interdigitalis)*	White-yellowish	Oval	4 mm	Present, straight linear
15	F	53	1st toenail, right	+ *(T. rubrum)*	White-yellowish	Quadrangular	12 mm	Present, wavy linear

yellow-white-brown-orange color below the plate that continued distally with a yellowish band of onycholysis defined as "canal", which is the most specific sign of dermatophytoma and represents the root of penetration of fungi under the nail plate.

Our study indicates that onychoscopy may serve as a noninvasive alternative for early diagnosis, particularly by identifying the canal, which represents a useful feature to be systematically searched for as it can help improve the diagnostic accuracy of this entity.

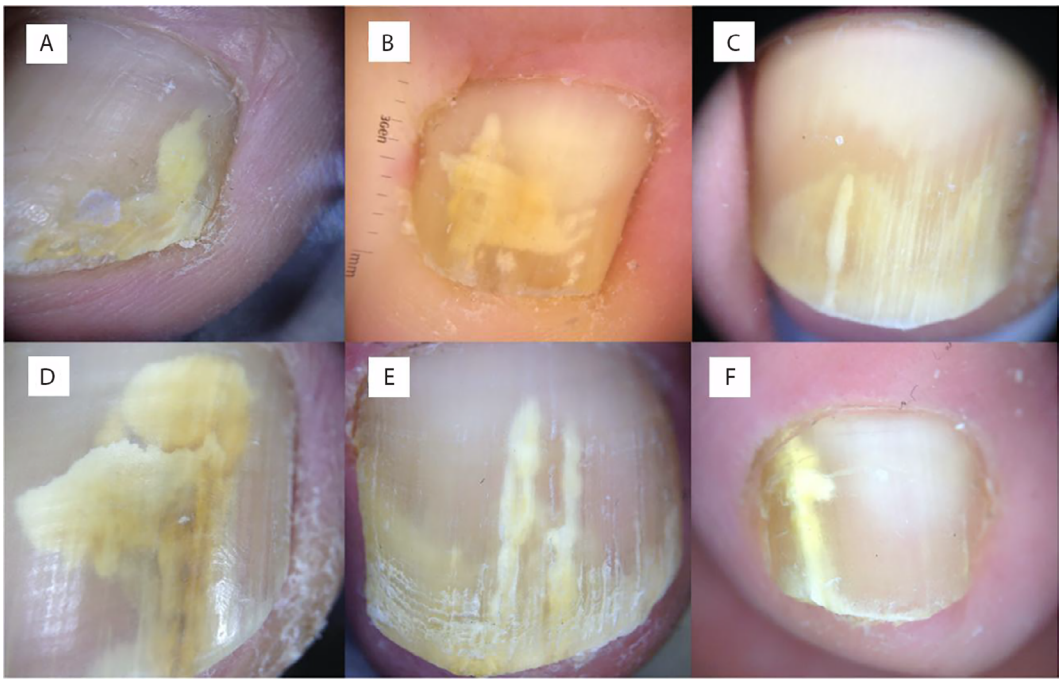

Figure 1. Onychoscopy of dermatophytomas of patients 1 (A), 5 (B), 6 (C), 11 (D), and 12 (E, F): 1st and 4th right toenail, respectively). In addition to the different colors and shapes of the dermatophytoma, it is possible to appreciate the different shapes of the onycholytic band ("canal") distally.

Recognizing the canal with onychoscopy is helpful in starting an antifungal therapy similar to distal subungual onychomycosis but associated with mechanical removal of the mass to increase treatment efficacy [1,5]. From a clinical perspective, training dermatologists to systematically assess for the canal during onychoscopic examination may improve early detection of dermatophytoma and prevent therapeutic failure. Incorporating this sign into diagnostic algorithms and routine nail examination protocols could enhance both diagnostic accuracy and patient outcomes.

Ethics Statements: The patients were informed of the use of their clinical information according to the Declaration of Helsinki principles and photos for publication intent. Informed consent was appropriately obtained during the medical examination.

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