Onychoscopic evaluation of distal and lateral subungual onychomycosis: A cross-sectional study in Lebanon

Ismael Maatouk1,2, Roger Haber3, Nazim Benmehidi4

1 Department of Dermatology, Clemenceau Medical Center Affiliated with Johns Hopkins, Beirut-Lebanon
2 Faculty of Health and Life Sciences, De Montfort University, Leicester LE1-9BH, UK
3 Saint George Hospital University Medical Center, Faculty of Medicine, University of Balamand, Beirut, Lebanon
4 Clinic of Dermatology, Ouled Fayet, Algiers, Algeria

ABSTRACT

Background and Purpose: The aim of this study was to evaluate the onychoscopic patterns associated with distal lateral subungual onychomycosis (DLSO) in Lebanon.

Methods and Methods: The present study was conducted on 45 patients with clinical DLSO attending two dermatology clinics in Beirut, Lebanon, between January 2018 and April 2018. The patients were subjected to dermatoscopy to identify the onychoscopic patterns.

Results: The DLSO was predominantly associated with white, yellow, and brown color changes (P<0.05). Dermoscopic patterns of longitudinal striae (n=31; 68.75%), spiked pattern (n=25; 55.5%), and jagged pattern (n=25; 55.5%) were significantly correlated with DLSO (P<0.001). Our findings are in accordance with five previous reports in which dermoscopic findings are discussed in onychomycosis.

Conclusion: It is recommended to perform further studies on homogeneous groups with different clinical subtypes of onychomycosis including patients with suspected traumatic onycholyisis or other nail diseases. Identification of onychoscopic patterns would offer the clinicians a quick, simple, and complementary tool for the diagnosis of onychomycosis.

Keywords: Dermatoscopy, Fungus, Lebanon, Nail, Onychomycosis, Onychoscopy

Introduction

Onychomycosis affects nearly 5% of the population worldwide [1]. It accounts for 40-50% of onychopathies and about 30% of cutaneous fungal infections [2, 3]. In a study conducted on 772 patients in Lebanon in 2006, a positive culture, predominantly with dermatophyte growth, was reported in 54.3% of cases [4]. Onychomycosis is usually diagnosed clinically and can be confirmed by 10-30% KOH examination, fungal culture, and/or nail plate biopsy with periodic acid Schiff (PAS) staining [5, 6]. However, these tests may show false negative results in at least 35% of cases [7].

Onychoscopy is the dermatoscopic evaluation of the nail and its associated structures. This modality facilitates the identification of various patterns and acts as a link between the naked eye examination and nail histopathology, thereby helping physicians and especially dermatologists to reduce unnecessary laboratory examinations. In contrast to other methods, namely fungal culture, direct nail examination, and nail plate biopsy, onychoscopy is a non-invasive, quick, and inexpensive tool for the assessment of onychomycosis.

Therefore, this technique can be used for the enhancement of the diagnostic accuracy of distal lateral subungual onychomycosis (DLSO). Moreover, in selected cases, it could be a practical and effective diagnostic tool when mycology is not readily available. The aim of this study was to evaluate the onychoscopic patterns associated with DLSO as a morphological type of onychomycosis. Identification of these patterns would offer clinicians a quick, simple, and complementary tool for the diagnosis of onychomycosis.

Materials and Methods

The present study was conducted on patients with clinical DLSO attending two dermatology clinics in Beirut, Lebanon, between January 2018 and April 2018. Out of 74 clinically suspected cases, the diagnosis of...
DLSO was confirmed in 45 patients using 20% KOH, fungal culture, or nail biopsy. The patients who were on topical and/or systemic antifungal therapy for the past 3 months were excluded from the study. All patients underwent dermoscopy with a Delta 20T contact dermoscope (Heine’s delta 20 T, Herrsching, Germany) in order to identify the most frequent patterns.

The observed patterns were defined as jagged (having a non-linear proximal edge of the onycholytic area), spiked (having longitudinal indentations or spikes directed to the proximal fold of the onycholytic area), and striae (having matte pigmentation distributed in striae within the nail plate). After data entry, they were analyzed in SPSS software (version 23). Chi-square test was used to test the association between DLSO type and dermatoscopic pattern. A p-value less than 0.05 was considered statistically significant.

**Results and discussion**

The study included 45 patients clinically presenting with DLSO and testing positive for fungal elements by 20% KOH mount, fungal culture, or nail biopsy with PAS stain. The participants were 25 (55.5%) males and 20 (44.4%) females, with a mean age of 43.33 years (range: 24-76 years). The color changes noted in the nail plate included brown (15-33.3%), yellow (14-31.1%), white (10-22.2%), and orange (6-13.3%). However, the black color was not noted. The DLSO was predominantly associated with white, yellow, and brown color changes ($P<0.05$).

Other changes included brown dots (8-17.7%), pits (4-8.8%), and splinter hemorrhages (2-4.4%). However, there was no statistically significant correlation between these changes and the clinical variants. As shown in Figure 1, the most common pattern noted was longitudinal striae (31-68.75%), followed by spiked pattern (25-55.5%) and jagged pattern (25-55.5%), distal irregular termination (5-11.1%), and linear edge (2-4.4%). Based on the results, the dermoscopic patterns of longitudinal striae ($n=31; 68.75$%), spiked...
In accordance with the previous results, dermoscopy has been consistently associated with traumatic onycholysis [8, 9, 12]. In our study, the presence of this pattern in DLSO (n=2, 4.4%) was not statistically correlated with DLSO (P<0.001).

However, this technique should not replace the standard tests when needed. Furthermore, our study population did not include homogeneous groups with different clinical subtypes of onychomycosis and consisted of onychoscopic patterns extensively limited to only DLSO. Additionally, our study included cases which were positive based on one of the methods of direct examination, culture, or nail biopsy.

**Conclusion**

To the best of our knowledge, this is an additional study to the five previously published reports in which dermatoscopic patterns in onychomycosis have been discussed. Our findings regarding the frequent longitudinal striae, jagged, and spiked patterns observed in DLSO are in accordance with the previous descriptions. It is recommended to perform further studies using homogeneous groups with different clinical subtypes of onychomycosis and including patients with suspected traumatic onycholysis or other nail diseases. Identification of these patterns would offer clinicians a quick, simple, and complementary tool for the diagnosis of onychomycosis.

**Acknowledgments**

No funding is declared.

**Author’s contribution**

I. M., R. H., and N. B. contributed to study design. I. M. and R. H. contributed to data collection and analysis. I. M., R. H., and N. B. contributed to the writing and final approval of the manuscript.

**Conflicts of interest**

None declared.

**Financial disclosure**

None declared.

**References**

1. Murray SC, Dawber RP. Onychomycosis of toenails: orthopedic
and pediatric considerations. Australas J Dermatol. 2002; 43(2):105-12.
2. Midgley G, Moore MK. Nail infections. Dermatol Clin. 1996; 14(1):41-9.
3. Richard K, Scher PK. Onychomycosis: a significant medical disorder. J Am Acad Dermatol. 1996; 35(3):S2-5.
4. El Sayed F, Ammoury A, Haybe RF, Dhaybi R. Onychomycosis in Lebanon: a mycological survey of 772 patients. Mycoses. 2006; 49(3):216-9.
5. Baran R, Hay R, Haneke E, Piraccini BM, Tosti A. Onychomycosis: the current approach to diagnosis and therapy. Florida: CRC Press; 2006.
6. Kaur R, Kashyap B, Bhalla P. Onychomycosis—epidemiology, diagnosis and management. Indian J Med Microbiol. 2008; 26(2):108-16.
7. Chang A, Wharton J, Tam S, Kovich OL, Kamio H. A modified approach to the histologic diagnosis of onychomycosis. J Am Acad Dermatol. 2007; 57(5):849-53.
8. Piraccini BM, Balestri R, Starace M, Rech G. Nail digital dermoscopy (onychoscopy) in the diagnosis of onychomycosis. J Eur Acad Dermatol Venereol. 2013; 27(4):509-13.
9. Jesus-Silva MA, Fernandez-Martinez R, Roldan-Marín M, Arenas R. Dermoscopic patterns in patients with a clinical diagnosis of onychomycosis-results of a prospective study including data of potassium hydroxide (KOH) and culture examination. Dermatol Pract Concept. 2015; 5(2):39-44.
10. De Cignis G, Valgas N, Rezende P, Leverone A, Nakamura R. Dermatoscopy of onychomycosis. Int J Dermatol. 2014; 53(2):e97-9.
11. Yadav TA, Khopkar US. White streaks: dermoscopic sign of distal lateral subungual onychomycosis. Indian J Dermatol. 2016; 61(1):123.
12. Chetana K, Menon R, David BG. Onychoscopic evaluation of onychomycosis in a tertiary care teaching hospital: a cross-sectional study from South India. Int J Dermatol. 2018; 57(7):837-42.