Original paper

Dermoscopic findings of fungal melanonychia

Ömer Faruk Elmas[1], Mahmut Sami Metin[2]

[1]Department of Dermatology and Venereology, Faculty of Medicine, Ahi Evran University, Kırşehir, Turkey
[2]Department of Dermatology and Venereology, Batman Medical Park Hospital, Batman, Turkey

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Abstract

Introduction: There are very few studies about dermoscopic findings of fungal melanonychia (FM) apart from the case reports.
Aim: To reveal and identify dermoscopic findings which facilitate diagnosis of the FM.
Material and methods: The study included a total of 42 nails from 33 patients diagnosed with FM on the basis of the clinical history, physical examination, dermoscopic findings and microbiological investigation. All of the dermoscopic images were retrospectively reviewed and the findings identified were recorded in a period of 1 year.
Results: The most common presentation was homogenous brown pigmentation (n = 15, 35.7%). The other presentations included: homogenous black (n = 9, 21.4%), homogenous grey (n = 9, 21.4%), clumped/granular black (n = 7, 16.6%) and irregular longitudinal black (n = 4, 9.5%) pigmentation. Superficial transverse striation was observed in 11 (26.1%) nails. Twenty (47.6%) nails showed white streaks (white longitudinal striae) and 6 (14.2%) nails showed distal white jagged edge (also known as "spikes"). Twenty-two (52.3%) nails had at least one of white streaks and jagged edge findings. 4 (9.5%) nails showed pseudo Hutchinson's sign.
Conclusions: To the best of our knowledge, this is the most comprehensive study regarding the dermoscopic patterns of FM. Here, we also evaluated onychomycosis associated dermoscopic findings like white longitudinal striae and jagged edges. Our study, along with the previous studies, showed that dermoscopy can be a very helpful method in the diagnosis of FM. Long disease duration, homogenous pigmentation pattern, presence of white streaks and jagged edges are the main clues to FM.

Key words: fungal, dermoscopy, melanonychia, onychomycosis.

Introduction

Onychomycosis is the most common nail disorder described as fungal infection of the nail unit [1]. The prevalence of the disease has been reported to be 23% in Europe [2] and 20% in East Asia [3]. Onychomycosis is commonly considered in 5 clinical subtypes: distal subungual onychomycosis, proximal subungual onychomycosis, endonyx onychomycosis, white superficial onychomycosis and total dystrophic onychomycosis [4]. There are many methods like direct microscopic examination with potassium hydroxide (KOH) preparation, culture, nail plate biopsy using periodic Acid-Schiff (PAS) stain and rarely polymerized chain reaction (PCR) for diagnosis of the onychomycosis [5, 6]. Direct microscopic examination with potassium hydroxide (KOH) preparation is known to be a practical and effective method for diagnosis.

Differential diagnosis of the pigmented nail lesions can be very challenging and almost all dermatologists' priority is to exclude melanoma when a case of nail pigmentation is encountered. Onychomycosis is one of the causes of pigmented nail and the term of fungal melanonychia (FM) describes brown to black pigmentation on the nail caused by onychomycosis [6].

FM is caused by fungi having ability to produce melanin. Up to now, at least 21 different species of fungi which can cause FM have been described. *Scytalidium dimidiatum*, *Trichophyton rubrum*, *Alternaria* and *Exophiala* are the most common causes of FM [7].

Dermoscopy is a widely used non-invasive method in the diagnosis of many dermatological diseases. However, nail dermoscopy, also known as "onychoscopy", is a rather new method in the diagnosis of nail disorders and was used in the diagnosis of nail pigmentation at

Address for correspondence: Ömer Faruk Elmas MD, Department of Dermatology and Venereology, Faculty of Medicine, Ahi Evran University, Kırşehir 40000, Turkey, phone: +90 5330260679, e-mail: omerfarukmd@gmail.com
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first [8]. Later on, it became a widely used tool in the diagnosis of neoplastic and non-neoplastic nail diseases.

Aim

Apart from the case reports, there are very few studies about dermoscopic findings of FM [9, 10]. In the present study, we aimed to reveal and identify dermoscopic findings which facilitate diagnosis of the fungal melanonychia.

Material and methods

The study included a total of 47 nails from 38 different patients diagnosed with FM on the basis of clinical history, physical examination, dermoscopic findings and microbiological investigation in one year. Microbiological confirmation with direct microscopic examination (20% potassium hydroxide preparation) was done for all of the cases. Dermoscopy was performed using a polarized-light handheld dermoscope with 10-fold magnification (DermLite DL4; 3Gen, San Juan Capistrano, CA, USA). At least two dermoscopic images of each affected nail were taken using a camera phone with a high resolution (iPhone 7 plus, Apple, California, USA). All of the dermoscopic images were retrospectively reviewed and the findings identified were recorded. Patients were grouped by age and gender. The clinical subtypes of the fungal infection and durations of the pigmentation were also recorded. Descriptive statistical analysis was performed. All the procedures followed were in accordance with the Helsinki Declaration and the study was approved by the local clinical research ethics committee.

Results

Microbiologically confirmed 47 nails with FM from 38 different patients were included in the study. Five nails from 5 different patients were excluded from the study due to green colour change probably associated with concomitant pseudomonas infection. Finally, 42 nails from 33 different patients were evaluated.

Twenty (60.6%) patients were male and 13 (39.3%) were female. The mean age was 51 ±15.3 years (range: 28–82). The most common localization was big toe (26 nails, 61.9%). The mean duration of the pigmentation was 4.8 ±4.1 years (range: 9 months–20 years).

Twenty-seven patients had just one nail involved, 3 patients had 2 nails involved and 3 patients had 3 nails involved.

The clinical type of the onychomycosis was distal subungual onychomycosis in 20 nails, total dystrophic type in 19 nails, white superficial type in 2 nails and proximal subungual type in one nail.

Distribution of the pigmentation was homogenous in 33 (78.5%) nails, clumped/granular in 8 (19%) nails, both homogenous and clumped/granular in 4 (9.5%) nails, and irregular longitudinal in 4 (9.5%) nails.

The most common colour of the pigmentation was brown with 21 (50%) nails followed by black in 19 (45.2%) nails, grey in 11 (26.1%) nails, both brown and black in 5 (11.9%) nails. One case showed multiple colours with grey, brown, yellow, and black. The cases showing just yellow and yellowish brown colour change were not included.

The most common presentation was homogenous brown pigmentation (n = 15, 35.7%) (Figure 1). The other presentations were as follows: homogenous black in 9 (21.4%) nails (Figure 2 B), homogenous grey in 9 (21.4%) nails (Figure 3), clumped/granular black in 7 (16.6%) nails (Figure 4) and irregular longitudinal black in 4 (9.5%) nails (Figure 2). Superficial transverse striation was observed in 11 (26.1%) nails (Figure 4 B).

Dermoscopic patterns of the cases are summarized in Table 1.

When coming to the specific dermoscopic findings associated with onychomycosis, 20 (47.6%) nails showed white streaks (white longitudinal striae) (Figures 1 B, 2 and 3 A) and 6 (14.2%) nails showed a distal white jagged edge (also known as "spikes") (Figure 3 A). Twenty-two (52.3%) nails had at least one of white streaks and jagged edge.

Four (9.5%) nails showed pseudo Hutchinson's sign (Figure 3 B).

Discussion

The term of melanonychia describes nail plate pigmentation and it can occur due to many causes like malignant melanoma (MM), melanocytic activation of the nail matrix, drugs and hereditary conditions. Fungal melanonychia (FM) is a rare cause of nail pigmentation. The diagnosis of FM may be very challenging because it can easily be confused clinically with melanocyte related melanonychia [10]. In this context, dermoscopy may be a helpful tool to reach the true diagnosis.

When the literature is reviewed it seems that there are only two research studies about dermoscopic findings of FM in the literature [9, 10]. Karaarslan *et al.* and Ohn *et al.* described dermoscopic findings of 20 and 18 nails with FM, respectively. Here we described dermoscopic findings of 42 nails diagnosed with FM.

In the Ohn *et al.*'s study, the most common colour was yellow (77.8%), followed by black (55.6%), light brown (38.9%), dark brown (22.2%), and grey (16.7%) [7]. We excluded yellow and yellowish brown colour changes from the study because the term of melanonychia describes "brown to black" discoloration [10]. In our study, the most common colour was brown with 21 (50%) nails followed by black in 19 (45.2%) nails, grey in 11 (26.1%) nails, both brown and black in 5 (11.9%) nails.

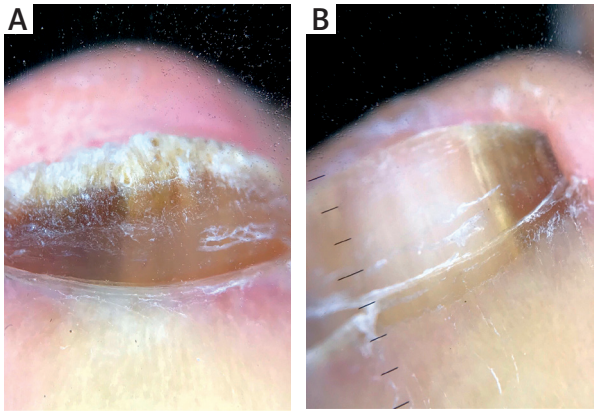

Figure 1. Homogenous brown pigmentation pattern

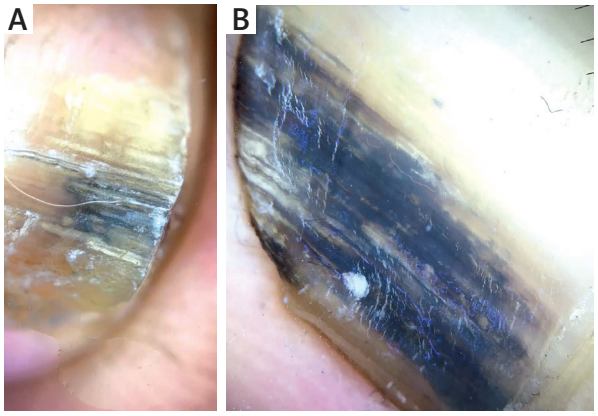

Figure 2. A, B – Irregular longitudinal black pigmentation pattern. Homogenous black pigmentation pattern **(B)**

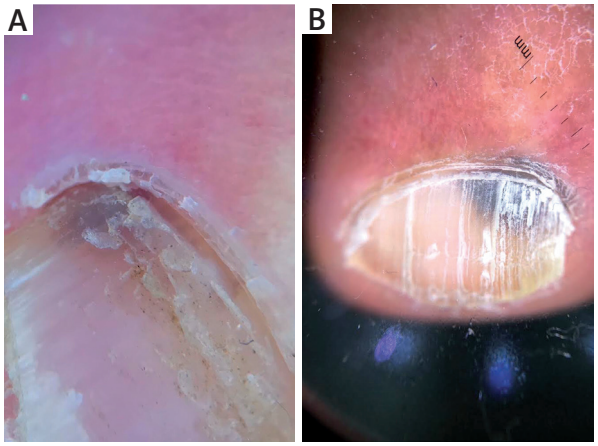

Figure 3. Homogenous grey pigmentation pattern is visible

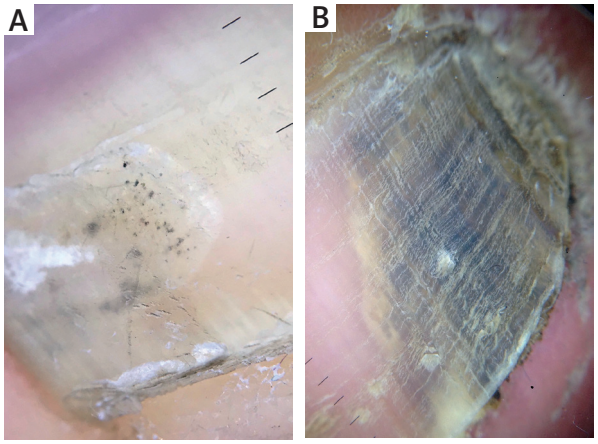

Figure 4. Clumped/granular black pigmentation pattern. Superficial transvers pigmentation **(B)**

The "multicolour pattern" was detected in 88.9% and 95% of the lesions in Ohn *et al*.'s study and Karaarslan *et al*.'s study, respectively. We observed the multicolour pattern just in one case. This big difference was due to a different description of the "multicolour pattern". We accepted the multicolour pattern as presence of at least three completely different colours. In the present study, the only case with a multicolor pattern showed a combination of grey, brown, orange and yellow colours. If we also described the multicolour pattern as the presence of two or more colours, the 38 (90.4%) of 42 nails can be defined as having multicolour pattern FM.

Table 1. Dermoscopic pattern of fungal melanonychia

Dermoscopic pattern	Number of the patients (%)
Homogenous brown pigmentation	15 (35.7)
Homogenous grey	9 (21.4)
Homogenous black	9 (21.4)
Clumped/granular black	7 (16.6)
Irregular longitudinal black	4 (9.5)

In the study of Karaarslan *et al*., the main pattern of the pigmentation was homogenous. Black pigmented aggregation accompanied in 80% of the cases [9]. Ohn *et al*. classified the pigmentation patterns into longitudinal (44.4%) and non-longitudinal homogenous patterns (55.6%) [10].

Here we evaluated each of the lesions in combination of the colour and pattern of the pigmentation. The most common presentation was homogenous brown pigmentation followed by homogenous black, homogenous grey, clumped/granular, (aggregated multiple granules of different sizes), black and irregular longitudinal black pigmentation. We observed a longitudinal pattern just in 4 (9.5%) cases.

We observed superficial transverse striation in 11 (26.1%) nails. This rate was 35% (7 of 20 nails) in the study of Karaarslan *et al*.

White streaks and jagged edges were previously described as highly sensitive and specific signs for distal

subungual onychomycosis [11]. We observed these findings in 20 (47.6%) and 6 (14.2%) nails, respectively. Twenty-two (52.3%) nails had at least one of white streaks and jagged edge. We think that the presence of these findings in FM cases provides important clues to the fungal origin of melanonychia.

Lack of a comparison group is the main limitation of the study.

Conclusions

This is the most comprehensive study focused on the dermoscopic findings of FM. Our study, along with the previous studies, showed that dermoscopy can be a very helpful method in the diagnosis of FM. Long duration of pigmentation, homogenous pigmentation pattern, presence of white streaks and jagged edges are the main clues to FM.

Conflict of interest

The authors declare no conflict of interest.

References

1. Welsh O, Vera-Cabrera L, Welsh E. Onychomycosis. Clin Dermatol 2010; 28: 151-9.
2. Haneke E, Roseeuw D. The scope of onychomycosis: epidemiology and clinical features. Int J Dermatol 1999; 2 38 Suppl: 7-12.
3. Ogasawara Y. Prevalence and patient's consciousness of tinea pedis and onychomycosis. Nihon Ishinkin Gakkai Zasshi 2003; 44: 253-60.
4. Öztürk G. Clinical manifestations of dermatophyte infections of the trunk and extremities Turkiye Klinikleri J Intern Med Sci 2005; 1: 6-11.
5. Gupta AK, Ricci MJ. Diagnosing onychomycosis. Dermatol Clin 2006; 24: 365-9.
6. Ercan A, Saracli MA, Ahmet A, et al. Polymerase chain reaction in the diagnosis of onychomycosis. Eur J Dermatol 2004; 14: 52-5.
7. Finch J, Arenas R, Baran R. Fungal melanonychia. J Am Acad Dermatol 2012; 66: 830-41.
8. Ronger S, Touzet S, Ligeron C, et al. Dermoscopic examination of nail pigmentation. Arch Dermatol 2002; 138: 1327-33.
9. Kilinc Karaarslan I, Acar A, Aytimur D, et al. Dermoscopic features in fungal melanonychia. Clin Exp Dermatol 2015; 40: 271-8.
10. Ohn J, Choe YS, Park J, Mun JH. Dermoscopic patterns of fungal melanonychia: a comparative study with other causes of melanonychia. J Am Acad Dermatol 2017; 76: 488-93.
11. Piraccini BM, Balestri R, Starace M, Rech G. Nail digital dermoscopy (onychoscopy) in the diagnosis of onychomycosis. J Eur Acad Dermatol Venereol 2013; 27: 509-13.