

Dermoscopic Features of Distal Lateral Subungual Onychomycosis

Abstract

Background: Onychomycosis is a very common disease and accounts for upto 50% of the diseases affecting the nail apparatus. Diagnosis of onychomycosis is usually confirmed with the help of a potassium hydroxide (KOH) mount and fungal culture. Onychoscopy can be a handy and additional tool for the diagnosis. **Aims and Objectives:** To determine the dermoscopic findings in distal lateral subungual onychomycosis (DLSO). **Materials and Methods:** A prospective study of 60 nails with a clinical and mycological diagnosis (KOH with Chicago sky blue positive) of DLSO. Dermoscopic examination was performed using a Heine delta 20 plus dermatoscope and the features were recorded. **Results:** Longitudinal striae and jagged proximal edges seen in all 60 (100%) patients. Intermittent spiked pattern was seen in 47 nails (78.3%). Chromonychia and distal irregular termination were noticed in 23 (38.3%) and 7 (11.7%) nails, respectively. **Conclusions:** Onychoscopy can be used as an important diagnostic tool while evaluating nail disease, especially in DLSO. **Limitations:** Small study sample and lack of comparison with other nail diseases that manifests with distal onycholysis.

Keywords: Chromonychia, dermoscopy, longitudinal striae, onychomycosis

Introduction

Onychomycosis refers to invasion of the nail apparatus by fungal elements by dermatophytes or nondermatophytes molds and candida. It is a common infection and accounts for upto 50% of all nail disorders.^[1] Diagnosing onychomycosis is essential as it mimics several diseases such as psoriasis, lichen planus, and traumatic onycholysis. Onychomycosis requires a long course of treatment that may have certain adverse effects.^[2] The conventional methods for the diagnosis are direct microscopy with potassium hydroxide (KOH) and fungal culture. The sensitivity and the specificity of the KOH examination and culture vary from center to center.^[3] Addition of stains such as calcofluor white stain (CWS) or Chicago sky blue to direct microscopy increases the sensitivity of the procedure.^[4-6] Periodic acid Schiff staining and histopathological examination is a sensitive method for the diagnosis of onychomycosis when the clinical suspicion is high but is time-consuming and expensive.^[7]

Dermoscopy is a noninvasive technique that allows a magnified *in vivo* examination of the skin surface. Dermoscopy was mainly utilized for the evaluation of

pigmented skin lesions, and has increasing applications in the field of dermatology. It is most commonly used for diagnosis of melanomas and lately for hair disorders, nonmelanocytic skin disorders, infections, and also inflammatory disorders.^[8] Onychoscopic findings and patterns in distal lateral subungual onychomycosis (DLSO) have been described previously in few studies.^[9-11] The aim of this study was to determine the dermoscopic patterns associated with DLSO.

Materials and Methods

A prospective study was conducted during the period October 2016 to December 2016 after obtaining institutional ethical clearance. The study group comprised 60 nails from 49 patients with clinical and mycological diagnosis of onychomycosis. The history and clinical examination of the patient was undertaken and clinically suspected DLSO were included in the study after ruling out other causes of distal onycholysis, such as psoriasis and traumatic onycholysis. Confirmation of onychomycosis was made with 20% KOH preparation, followed by the use of Chicago sky blue staining; the presence of fungal elements was necessary for the diagnosis. Negative cases were excluded

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from the study. Onychoscopy was performed using Heine delta 20 Plus dermoscope (Hiene Optotechnik, Herrsching, Germany, ×10 magnification with polarization). Onychoscopic images were captured with phone camera (iPhone 6s – 12 megapixels) with and without interface medium (ultrasound gel). Piraccini *et al.*,^[9] Yadav and Khopkar^[11] have described various onychoscopic patterns in DLSO which were used in the analysis and identification of the most common patterns in the current study. The characteristic onychoscopic findings consistently observed in the previous studies were the longitudinal striae pattern and jagged proximal edges.

Results

A total of 60 nails with DLSO were included in the study. The duration of onychomycosis varied from 6 weeks to 24 months. The most common nail to be involved was the great toe (29) followed by the thumb (16). On clinical examination, 52 nails (86.7%) had subungual hyperkeratosis. The nails that were positive for fungal elements on microscopy were subjected to dermoscopy.

Onychoscopic findings of the DLSO are summarized in Table 1. Longitudinal striae [Figure 1] and jagged proximal edges [Figure 2] were seen in all 60 nails (100%). Both findings were statistically highly significant. ($P < 0.001$) Intermittent spiked pattern along the jagged proximal

edge [Figure 3a and b] was seen in 47 nails (78.3%). This finding was statistically highly significant. ($P < 0.001$). The longitudinal striae were sharp and were clearly noticed only in the affected portion of the nail. There was a clear demarcation shown between the affected portion and unaffected portion of nail in all the cases. The jagged proximal edges were projected toward the normal part of the nail. Other patterns such as chromonychia and distal irregular termination were also seen [Figure 4]. Chromonychia noticed in 23 (38.3%) nails was statistically significant (P value 0.046). Chromonychia varied from green, yellow, and brown colors nail plates with longitudinal white striae. Distal irregular termination was seen in 7 nails (11.7%) only. To measure the significance, z-test was used. Analysis was performed using Statistical Package for the Social Sciences software version 13. $P < 0.05$ and <0.001 were considered significant and highly significant respectively.

Discussion

Onychomycosis is a chronic fungal infection of the nail.

Table 1: Dermoscopic features noticed in distal lateral subungual onychomycosis

Pattern	Nail involved		Total Number
	Toe (29)	Finger (31)	
Longitudinal white striae	29 (100%)	31 (100%)	60 (100%)
Jagged proximal edge	29 (100%)	31 (100%)	60 (100%)
Intermittent spiked pattern	19 (65.5%)	28 (90.3%)	47 (78.3%)
Chromonychia	9 (31%)	14 (45.2%)	23 (38.3%)
Distal irregular termination	4 (13.8%)	3 (9.6%)	7 (11.7%)

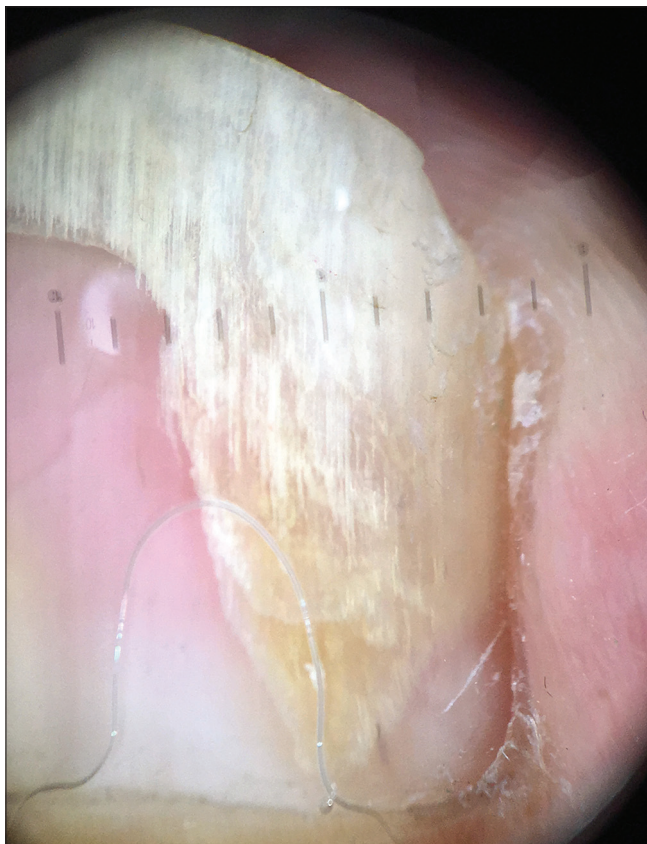


Figure 1: Longitudinal striae on the onychomycosis affected portion of the nail (10× magnification, polarized mode with interface medium)



Figure 2: Jagged proximal edge with spikes on the onycholytic nail (early onychomycosis) (10× magnification, polarized mode with interface medium)

Although it is not a life-threatening disease, it affects the quality of life due to the discomfort during routine activities and cosmetic unsightliness. Among the different types of onychomycosis, the most common form is DLSO with a prevalence of around 62%.^[1] Clinical diagnoses of onychomycosis should be supplemented by a laboratory confirmation before treating with oral antifungals. The laboratory tests such as the KOH preparation, culture, or histopathology are tedious, expensive, and time-consuming and requires expert manpower.

Dermoscope plays a very important role in the ease of diagnosis of dermatological disorders being a noninvasive procedure. The use of dermoscope in onychomycosis has been described in a few studies in the past.^[9-12] In all studies on onychoscopy the finding of sharp demarcation between the affected and the normal nail was consistently observed. The longitudinal striae pattern and the jagged proximal edges were more frequently observed in patients with DLSO by most of the authors. Onychoscopic studies by various authors and our findings are summarized in Table 2. De Crignis *et al.* postulated that the longitudinal striae pattern is thought to be as a result of the direction of the fungal invasion. The fungus moves across the nail bed along the rete ridges in the proximal direction from the distal end and forms the specific longitudinal striae pattern. They noticed spikes project from the distal edge to the proximal aspect in an irregular but in a sharply defined manner, whereas the spikes seen due to onychorrhexis project from the proximal to distal edge of nail.^[12] Piraccini *et al.*^[9] noticed that traumatic onycholysis had a linear

edge without the sharp spiked border in comparison to the onychomycotic onycholysis that had jagged proximal edges with spikes seen as indentations toward the normal nail. Our finding was in accordance with the findings as described by other studies and all nails had characteristic longitudinal striae pattern and jagged proximal edges. Jesus-Silva *et al.*^[10] noticed distal irregular termination in DLSO in 38.8%, which was also noticed in only 11.7% of our patients. Yadav and Khopkar^[11] had compared the findings seen in onychomycosis with psoriatic patients with distal lateral onycholysis, wherein they noticed orange discoloration of affected portion and absence of well-demarcated streaks.

Limitations of our study include a relatively small sample size of the study group and exclusion of the other types of onychomycosis. Comparison with another disease such as psoriasis could have more diagnostic implication.

Longitudinal striae and jagged edges with other features such as intermittent spiked pattern, chromonychia, and distal irregular termination on onychoscopy are the



Figure 3: (a) Clinical image of the nail with sharp demarcation of the onychomycotic portion of nail from normal portion. (b) Dermoscopic image of nail showing the well-demarcated separation of normal region from onychomycosis with longitudinal striae and jagged proximal edges with spikes (10x magnification, polarized mode without interface medium)

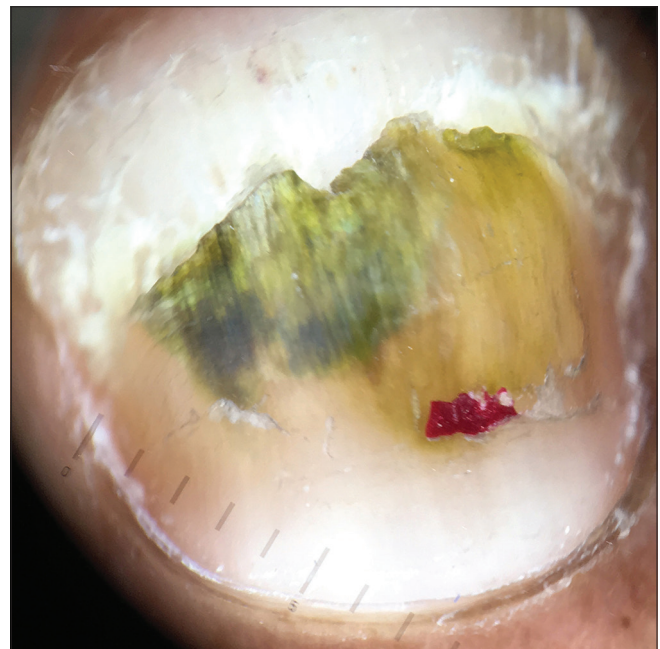


Figure 4: Chromonychia with distal irregular termination with longitudinal striae on the onychomycotic nail (10x magnification, polarized mode with interface medium)

Table 2: Dermoscopy of onychomycosis in various studies

Dermoscopic features	Piraccini <i>et al.</i> (2013) ^[9]	Jesús-Silva <i>et al.</i> (2015) ^[10]	Yadav and Khopkar (2016) ^[11]	De Crignis <i>et al.</i> (2014) ^[12]	Our study (2016)
	DLSO-37	DLSO-67	DLSO-21	DLSO-336	DLSO-60
Jagged proximal edge	37 (100%)	17 (25.3%)	21 (100%)	336 (100%)	60 (100%)
Longitudinal striae	32 (86.5%)	42 (62.6%)	21 (100%)	267 (79.5%)	60 (100%)
Spiked pattern	37 (100%)	17 (25.3%)	21 (100%)	336 (100%)	47 (78.3%)
Chromonychia	–	–	13 (61.9%)	–	23 (38.3%)
Distal irregular termination	–	26 (38.8%)	–	–	7 (11.7%)

findings that supplement the clinical diagnosis. These features can help in diagnosing onychomycosis with strong clinical suspicion in spite of negative laboratory results. Thus, dermoscopy should be performed routinely in the diagnosis of DLSO and can be used as a diagnostic tool in the absence of a laboratory setting.

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Conflicts of interest

There are no conflicts of interest.

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