Benha Journal of Applied Sciences (BJAS) **print: ISSN 2356–9751**
Vol. (7) Issue (3) (2022), (145-148) **online: ISSN 2356–976x**
http://bjas.journals.ekb.eg

Onychoscopic Evaluation of Onychomycosis Before and After Treatment

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Abstract

About half of all nail diseases are caused by onychomycosis, a fungal infection of the nail caused by dermatophytes, yeasts, and non-dermatophyte moulds. There is some evidence that nail dermoscopy is a valuable diagnostic and follow-up technique for onychomycosis. Patients with onychomycosis who are taking oral terbinafine (250 mg) for six weeks will have their dermoscopic alterations evaluated. 30 Egyptian patients with clinical and mycological diagnosis of onychomycosis were included in this study. They were picked from the dermatology out-patient clinic, Dermatology Department, Benha University Hospitals in Egypt for the study. Direct microscopy with 20% potassium hydroxide (KOH) and fungus culture on Sabouraud dextrose agar medium and nutritional agar media were used to evaluate all nail specimens. Pre- and post-treatment polarised noncontact dermoscopic examinations with oral terbinafine (250 mg) were performed using the dermoscope. Results: KOH was positive in all of the patients. 56.7 percent of the samples were positive for T. Rubrum, 20 percent for T. Mentagrophyte, 13.3 percent for Aspergillus Niger, 6.7% for Candida, and 3.3% for Aspergillus Flavus. Distolateral subungual onychomycosis (DLSO) was the most prevalent form (73.3 percent). Terbinafine was given to all patients (250 mg). Thickness, subungual hyperkeratinization, periungual inflammation, and dystrophy (P 0.001) were all significantly improved as compared to baseline data. With each successive follow-up period (P=0.001, P=0.001, P=0.001, P=0.001, P=0.001, P=0.001), the aurora pattern, onycholysis, jagged distal edge, spike pattern, uneven distal termination and longitudinal stria frequencies progressively improved. As a result, dermoscopy is a rapid, noninvasive, and helpful method for diagnosing onychomycosis and monitoring its progress after therapy.

Keywords:

1. Introduction

An onychomycosis is an infection of the nail caused by dermatophytes, yeasts, and non-dermatophyte mould that accounts for approximately 50% of all nail-related disease. It is characterised by onycholysis, hyperkeratosis and splitting of the nail as well as discoloration of the nail. The nail unit, which includes the nail plate, nail matrix, and nail bed, can be affected (4).

Onychomycosis diagnosis relies heavily on microscopy and fungus culture, the gold standard methods.

(5)

Onychomycosis may be diagnosed quickly and effectively using nail dermoscopy. A nonprocedural evaluation of the complete nail unit is possible compared to mycological investigations (6).

Onycholysis with a jagged proximal edge, sharp structures called spikes directed toward the proximal nail fold, white to yellow longitudinal striae, and parallel bands of different colours known as the "Aurora Borealis" pattern are the dermoscopic findings that are considered specific for onychomycosis (7).

Systemic therapies for onychomycosis are often more successful, with greater percentages of mycological and full clinical cures (8).

2.Patients And Methods

This is a comparative cross sectional study which included a total of 30 Egyptian patients with clinical and mycological diagnosis of onychomycosis, selected from those attended the dermatology out-patient clinic, Dermatology Department, Benha University hospitals. Patients with another nail disorders such as psoriasis or lichen planus, systemic diseases, pregnant and lactating females were excluded from the study.

All patients were subjected to full history taking, general examination to exclude other diseases that mimic onychomycosis such as psoriasis, lichen planus or trauma, local nail examination to detect the type of onychomycosis.

All specimens were examined by means of direct microscopy with 20% potassium hydroxide (KOH) and by means of fungal culture on Sabouraud dextrose agar medium and nutrient agar medium.

Dermoscopic examination using polarized noncontact (Patient' nails are photographed by Dermlite DL3 (3Gen, USA), dermoscope before and after treatment with oral terbinafine (250 mg) after 6 weeks of treatment.

Statistical Analysis

The collected data was revised, coded, tabulated and introduced to a PC using Statistical package for Social Science **(IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.).** Shapiro test was done to test the normality of data distribution. Mean and standard deviation (± SD) for parametric numerical data, while median and range for non-parametric numerical data. Frequency and percentage of non-numerical data.

The Kruskal-Wallis test was used to assess the statistical significance of the difference between more than two study group non parametric variables. Chi-Square test was used to examine the relationship between two qualitative variables. Fisher's exact test was used to examine the relationship between two qualitative variables when the expected count is less than 5 in more than 20% of cells. A P value is considered significant if <0.05 at confidence interval 95%.

3. Results

The mean age of studied group was 34.6 years, they were 4 males (13.3%) and 26 females (86.7%)**(Table 1).** Most of patients were house wives (66.7%), followed by nurses (10%), teachers (10%), while workers were 6.7% and students were 6.7%. Disease duration ranged from 12 to 48 months.

Table 1: Demographic data of all studied cases.

		Cases N=30 (%)	
Age (years)	**Mean±SD**	34.6	±10
Males	**N (%)**	٤	(13.3%)
Females	**N (%)**	26	(86.7%)

The thumb was the most affected finger (36.7%), followed by middle finger (30%). All patients had positive KOH. Culture revealed T.Rubrum in 56.7%, T. Mentagrophyte in 20%, Aspergillus Niger in 13.3%, Candida in 6.7% and Aspergillus Flavus in 3.3%.

The most common type was distolateral subungual onychomycosis (DLSO) (73.3%), while distolateral subungual / total dystrophic onychomycosis overlap (DLSO/TDO) accounted for 16.7%, and total dystrophic (TDO) was 10% **(Table 2).** The most clinical findings were discoloration (100%), followed by thickening (63.3%) and onycholysis (63.3%), periungual inflammation (53.3%). While the least findings were Trachyonachia (3.3%).

Table 2: Clinical types among all studied cases

	Cases N=30 (%)	
	N	(%)
DLSO	22	(73.3%)
DLSO/TDO	5	(16.7%)
TDO	3	(10%)

Dermoscopic findings revealed that all cases had yellow discoloration (100%) followed by jagged proximal edges (90%) spiked patterns (73.3%), onycholysis (63%) longitudinal stria (40%) distal irregular termination (26.7%), Bluish Globules (3%), while Black Globules (13.3%), pits (13.3%), Splinter haemorrhage (13.3%), Black Globules (13.3%) were present (3.3 percent).

Terbinafine (250 mg) was given to all patients for six weeks. On average, improvements were seen after six weeks in the following areas: thickness, hyperkeratosis behind the gum line, inflammation in the gum tissue surrounding the gums, and dystrophy (P0,001, P=0.0160, P=0.004, P=0.043).

With each successive follow-up period (P=0.001, P=0.001, P=0.001, P=0.001, P=0.001, P=0.001), the aurora pattern, onycholysis, jagged distal edge, spike pattern, uneven distal termination and longitudinal stria frequencies progressively improved.

While Candida was related with no improvement after six weeks (P=0.005), T.rubrum was associated with modest to moderate improvement up to 75% (P=0.016). Also, overall dystrophy (P=0.012) was shown to be a significant predictor of poorer improvement.

No other form of pits was found to be related with Candida or T.Rubrum (100 percent and 11.8 percent, respectively).

For the dermoscopic inspection, there was no significant correlation with organism type.

4. Discussion

Onychomycosis may be found in up to 50% of nail infections and 30% of skin infections caused by superficial fungi. Inhibits ergosterol manufacture in fungi by inhibiting squalene epoxidase, a key enzyme in ergosterol biosynthesis (9) Terbinafine. Within a week of beginning treatment, terbinafine concentrations in the nails were found, and they remained for at least 30 weeks following treatment's end (10).

Dermoscopy of the nail plate helps to diagnose onychomycosis in a fast and effective manner (11).

In this research, we wanted to examine the dermoscopic alterations in individuals with fingernail onychomycosis before and after therapy with terbenafine for six weeks. "

Eighty-six percent of our patients were women, which is in line with a previous research (12) that identified a higher frequency of female patients than male patients (70.5 percent and 29.5 percent respectively). A study of found a similar 2:1 female to male prevalence (13). Women make about 62.5 percent of those with onychomycosis, according to a research by (14) that included 1771 individuals with the disease, of whom 1107 (62.5 percent) had the disease.

T.Rubrum (56.7%), T. Mentagrophyte (20%), Aspergillus Niger (13.3%), Candida (6.7%), and Aspergillus Flavus (3.3%) were found in culture in this investigation. Dermatophytes were shown to be the cause of 55.56 percent of patients in a study by Jeelani et al (15). Onychomycosis samples from Egypt had dermatophytes in 44.4% of cases, according to Abd El-

Glil and Abdul Fattah (16), and the most frequent dermatophyte was T. rubrum (37.8 percent). T. rubrum was found in 44.5 percent of onychomycosis patients described by Ahmad et al. (17).

Abdallah et al. (18) studied 80 individuals with onychomycosis and found that Aspergillus was present in 45 percent and Candida was prevalent in 32.5 percent of the patients. According to (19), the most often isolated organisms in culture were Candida, followed by dermatophytes and finally moulds that aren't dermatophytes (NDM).

DLSO was the most common kind of onychomycosis seen in this investigation (73.3 percent). DLSO was shown to be the most common kind of onychomycosis, followed closely by TDO in the research by Abd El-Aal et al. (12). In addition, Nada et al. (19) found that 85% of patients had DLSO and then TDO when they were evaluated clinically.

Discoloration, thickness, and onycholysis were the most common clinical findings in our investigation (63.3 percent). These results were in line with those of Rathod et al. (20), who found yellowish white discolouration in all instances (100 percent). The rough scaly surface was seen in 100% of instances, while onycholysis was found in 50% of TDO patients, according to the researchers.

A jagged proximal edge (90 percent), followed by spiking pattern (73.3 percent), onycholysis (63.3%), and longitudinal striae (63.3 percent) were the most common dermoscopic findings in our study group (40 percent). Yorulmaz and Yalcin's investigation (21) found that the majority of patients exhibited jagged proximal edges with spikes of the onycholytic region, followed by longitudinal streaks and patches, and finally subungual hyperkeratosis and brown-black pigmentation, with dermoscopic findings quite similar to ours (21).

Candida and T.Rubrum (100 percent and 11.8%, respectively) were shown to be strongly linked with pits in this investigation, but not with any other kind. For the dermoscopic inspection, there was no significant correlation with organism type. This is in line with the findings of Abdallah et al. (18), who identified no variations in dermoscopic patterns between individuals with a clinical diagnosis of onychomycosis who had single or mixed culture growth.

Even though T.rubrum was shown to be a significant predictor of mild-to-moderate to 75% recovery, Candida was found not to have any effect. According to Salo and Pekurinen, (22) terbinafine (250 mg/day) was better to fluconazole (150 mg/w) in a 12-week regimen for onychomycosis, 67 percent to 21 percent of patients respectively obtained full clinical cure in this study. Oral terbinafine exhibited a superior tolerability profile than griseofulvin, itraconazole, or fluconazole, according to Darkes et al., (23) and Tavakkol et al., (24).

5. Conclusion

An onychomycosis diagnosis may be made quickly and simply using dermoscopy, which is a non-invasive and effective method.

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