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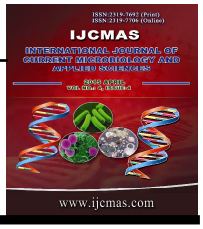

Original Research Article

Clinical and Microbiological study of *Tinea unguium* in a tertiary care centre

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Keywords

Tinea unguium, dermatophytes, subungual onychomycosis

A B S T R A C T

Tinea unguium, the commonest presentation of deformed nails is caused by dermatophytes, non-dermatophytes or yeast. Most common dermatophytes are Trichophyton rubrum, Trichophyton mentagrophytes and Epidermophyton floccosum. Clinical presentations varies from onychodystrophy, subungual hyperkeratosis, onycholysis or discolouration of nail plate. Objectives: Identification of the causative fungal organisms and to compare the clinical diagnosis of Tinea unguium with positivity of KOH smear examination and fungal culture. Methods: After disinfecting the nails with 70% alcohol, wet-mount, fungal culture and fungal slide culture were prepared. Statistical analysis used: SPSS Software version 14.0. Results: 65% cases were confirmed as patients of onychomycosis in 100 cases (Male: Female 63:37). Distal and lateral subungual onychomycosis was observed in 61.50% patients, with subungual hyperkeratosis as the most common presentation (38.50%). Sensitivity and negative predictive value of KOH examination was 89.23% and 83.33% while for Culture was 84.62% and 77.78% respectively. 48 cases were both KOH and culture positive. T. rubrum (30.80%) was the commonest among dermatophytes (57%) while among non-dermatophytes, Aspergillus species (9.20%) was the most common. Conclusions: Clinical diagnosis of onychomycosis should be confirmed by KOH and fungal culture to prescribe species specific antifungal drugs for optimal outcome.

Introduction

Onychomycosis accounts for about 20-40% of all onychopathies and about 30% of all cutaneous fungal infections [1]. Worldwide it affects about 5% population [2]. In India, incidence of infection varies from 0.5 to 5% [3, 4]. Prevalence in HIV patients is higher as compared to others [5]. Its incidence is increasing worldwide due to changes in living style like occlusive footwear usage, sports club facilities etc [6].

Its presentation varies according to the route of invasion [7, 8] which may be distal and lateral subungual onychomycosis, proximal subungual onychomycosis, superficial white onychomycosis, total dystrophic onychomycosis and endonyx. These types can clinically present as subungual hyperkeratosis, onycholysis, discolouration, thickening or dystrophy of nail plate. This condition needs to be differentiated from

certain diseases with similar presentations like psoriasis, lichen planus, contact dermatitis, traumatic onychodystrophies, pachyonychia congenita, nail bed tumours, yellow-nail syndrome (rare) or idiopathic onycholysis [9]. Along with clinical history, direct microscopy of KOH mount and culture provides definite diagnosis. Culture also helps in identification of the species and in proper selection of species specific anti-fungal drugs for the best results.

This study aims to isolate the causative species, which may help in identifying any yet unrecognized changing trend of the disease. It can also provide information regarding the predominant clinical pattern and the common epidemiological factors influencing the disease occurrence in this part of India. Moreover, in view of the introduction of several newer antifungal agents it will be more relevant to use species specific anti-fungal drugs.

Materials and Methods

This study was conducted from December 2010 to October 2012.

114 clinically suspected cases of Tinea unguium over a period of time from December 2010 to October 2012 included in the study were subjected to detailed history, clinical examination and relevant investigations. 14 cases lost follow up during the study.

Inclusion Criteria

Patients presenting for the first time in the outpatient department of Dermatology, Venereology and Leprosy with clinically suspected cases of tinea unguium presenting with onychodystrophy, onycholysis, subungual hyperkeratosis, melanonychia, leuconychia and thickening of nail plate were selected for the study.

Exclusion Criteria

1. Patients already receiving topical or systemic antifungal therapy for tinea unguium or some other fungal infection.

2. Patients with nail changes due to psoriasis, lichen planus, contact dermatitis or other systemic diseases

All the data was entered in the respective proforma which include age, sex, occupation, habits, long term drug intake and history of contact with animals or soil was also elicited. The patients were classified according to the sites of involvement.

Nails were collected after disinfecting with 70% alcohol. The specimen was divided into two portions. One for direct microscopy (in 10% KOH) smear examination and other for fungal culture on Sabouraud dextrose agar (SDA) slope with chloramphenicol, gentamicin and cycloheximide and Sabouraud dextrose agar slope (SDA) with chloramphenicol, and gentamicin without cycloheximide (to allow growth of non-dermatophytes).

Confirmation of species was done by fungal slide culture evaluation and lactophenol cotton blue (LCB) stain preparation.

Result and Discussion

Onychomycosis was found to be more common in females than males. (Table 1)

Maximum cases of onychomycosis were found in age group 46-60 years, followed by age group 31-45 years and 61-75 years. Least number of patients belonged to age group 0-15 years. This difference is found to be significant. (Table 2) Mean age in years was 37.83 ± 16.09, and age range of diseased cases was 8-78 years.

Onychomycosis was seen more common in patients who used to wear shoes. (Table 3)

Disease was found more commonly in people having contact with animals. (Table 4)

Maximum patients had contact with soil during their daily routine like gardening, farming etc. (Table 5)

Out of total 65 confirmed cases, maximum 40 cases (61.54%) were of digital subungual onychomycosis (DLSO) type followed by total dystrophic onychomycosis (TDO) type in 13 cases (20%), proximal subungual onychomycosis (PSO) in 9 cases (13.85%) and superficial white onychomycosis (SWO) in 3 cases (4.62%).

Subungual hyperkeratosis was the most common presentation found in 25 cases (38.46%) followed by total dystrophic nails in 17 cases (26.215%), onycholysis and discolouration both in 11 cases (16.92%) and only 1 case (1.54%) presented with thickening of nail plate.

58 cases (89.23%) were diagnosed to be positive by direct microscopy alone, while culture alone could diagnose only 55 cases (84.62%). KOH and culture together diagnosed a total of 65 out of 100 cases.

Dermatophytes (57%) were the most common cause of onychomycosis followed by non-dermatophytes (21.04%) and least by the yeast (6.20%).

Among dermatophytes, T. rubrum (30.80%) was the most common isolate in culture followed by T. mentagrophyte and E. flocossum (each 10.80%), while among non-dermatophytes Aspergillus species (9.20%) was the most common, followed by Candida species and Alternaria species (each 6.20%). (Table 6)

Onychomycosis is a fungal infection of nails present worldwide. In recent decades, there has been an increase in its prevalence. Its presentation and causative fungi show regional variation according to the environment, living style and co-morbid conditions.

Females were found to be more diseased than males in this study due to the nature of work (wet work) usually done by them in their daily life. Similar to our findings Aghamirian M [10] and Jesudanam M [11] also found disease to be more common in females (54.8% and 51.96% respectively). In contrast, males were found to be more commonly affected by Mashkoor et al [13] (71.5%) and Grover S [14] (62%).

In this study, onychomycosis was found affecting the patients most commonly between 46-60 years group followed by 31-45 year group and 61-75 year group. Rippon JW [15] and Aghamirian M [10] reported maximum occurrence in 40-60 year age group and 40-49 year age group respectively. 20-40 year age group was found to be most commonly affected in studies by Mashkoor et al [13] (60%) and Grover S et al [14] (51.43%).

Age group 46-60 year was found to be most commonly affected because of decreased linear nail growth while increased nail growth in 0-15 year age group could be the possible reason of least infection. Infection was found to be more common in shoe wearers than slipper users because warm and moist environment in shoes or occlusive footwear promotes the growth of fungus and development of onychomycosis which is not the case with those who wear slippers. No patient reached in OPD barefoot. Banerjee et al [16] and Desai [17] et al reported very low prevalence of onychomycosis in barefoot patients.

Fungal infection at a site other than nail (like tinea mannum, tinea pedis, etc) was found to be more associated with tinea unguium and this association was statistically significant. Jesudanam TM [11] reported the same association in 21.07% patients.

In our study, professionals, shop owners and clerks were found to be most commonly affected because they use to wear shoes and socks for long durations. Mashkoor et al [13] found infection to be more common in students (24%), housewives (13%), farmers (11%) and labourers (6%).

Contact with animals and soil was found to be more associated with infection. Gupta M [18] also reported association of onychomycosis with soil contact in 60.78% cases.

Distal and lateral subungual onychomycosis (DLSO) was the commonest type of onychomycosis accounting for 61.54% of cases in our study. Same results were reported in studies by Aghamirian M[10] (48.4%), Sujatha V[12] (90.57%) while Jesudanam TM[11] found candidal onychomycosis (58.82%) to be the most common type followed by DLSO (38.72%) type.

Most patients presented to us with subungual hyperkeratosis (38.46%), followed by dystrophic changes (26.20%). While Gupta M [18] found discoloration in 92.3% and subungual hyperkeratosis in 68.5% cases.

KOH showed more sensitivity (89.23%) as compared to culture (84.62%).This finding is in concordance with the results of Jesudanam TM et al [11] (KOH 93%, Culture 87.2%), Sujatha V[12] (KOH 77.14%, culture 60%)and Gupta M[18] et al (KOH 59.2%, Culture 37.4%). Culture positivity is low because fungi grow proximally and sample is taken from the distal part of nail where chances of getting viable fungus are very low.

Disease (as diagnosed by KOH and/or culture) was found in 65% cases while Nilay et al [19] found disease in only 51.76%. We propose that KOH should be coupled with culture to avoid false positive clinical diagnosis of onychomycosis, as also suggested by Fueilhade [20]. In our study, dermatophytes (57%) were found to be the most common causative agent followed by non-dermatophytes (21.40%) and yeast (6.20%). Similarly, in most cases, dermatophytic infection was found in 50% cases by Nilay et al [19], while Jesudanam TM [11] reported Candida in maximum (56.74%) and Sujatha V [12] reported *Aspergillus niger* in maximum (28.5%) cases.

Most common isolate in culture in the study was found to be Trichophyton rubrum (30.80%). This species is reported worldwide as most common causative agent, as supported by Mashkoor et al [13] (44.44%), and Grover S [14] (42.9%). Within non-dermatophytes, Aspergillus species (9.20%) is the most common isolate in our study, while Nilay et al [19] reported Candida as the most common non-dermatophyte in 22.72%.

Conclusion: Clinical diagnosis of onychomycosis should be confirmed by KOH and fungal culture to minimize error in clinical diagnosis. Culture helps in prescribing species specific antifungal for optimal results. Exophiala speices which was isolated in culture in a patient of onychomycosis in this study is a rare finding. Further studies need to be done to establish an association of Exophiala spieces in causation of onychomycosis.

Table.1 Distribution of Patients according to sex

	Diseased		Non-diseased		Total	
	No.	%	No.	%	No.	%
Male	37	58.73	26	41.27	63	63.00
Female	28	75.68	9	24.32	37	37.00
Total	65	65.00	35	35.00	100	100.00

χ^2=2.942 df=1 p>0.05

Table.2 Distribution of patients according to age group

Age (years)	Diseased		Non-diseased		Total	
	Number	%	Number	%	Number	%
0-15	4	40.00	6	60.00	10	10.00
16-30	19	52.78	17	47.22	36	36.00
31-45	21	77.78	6	22.22	27	27.00
46-60	17	85.00	3	15.00	20	20.00
61-75	3	60.00	2	40.00	5	5.00
76-90	1	50.00	1	50.00	2	2.00
Total	65	65.00	35	35.00	100	100.00

χ^2=10.818 df=5 p<0.05

Table.3 Distribution of patients according to the type of footwear worn by the patient.

Footwear	Diseased		Non-diseased		Total
	No.	%	No.	%	
Shoes	34	52.31	15	47.69	49
Slippers	31	42.86	20	57.14	51
Total	65	65.00	35	35.00	100

χ^2=0.813 df=1 p>0.05

Table.4 Distribution of cases according to contact with animal

Contact with animals	Diseased		Non-diseased		Total
	No.	%	No.	%	
Present	45	68.18	21	31.82	66
Absent	20	58.82	14	41.18	34
Total	65	65.00	35	35.00	100

χ^2=0.864 df=1 p>0.05

Table.5 Distribution of cases according to contact with soil

Contact with soil	Diseased		Non-diseased		Total
	No.	%	No.	%	
Present	19	67.86	9	32.14	28
Absent	46	63.89	26	36.11	72
Total	65	65.00	35	35.00	100

χ^2=0.140 df=1 p>0.05

Table.6 Distribution of patients according to species found on Culture

Species	Frequency	Percentage
T.rubrum	20	30.80
T.violaceum	3	4.60
T.mentagrophyte	7	10.80
E. floccosum	7	10.80
Alternaria species	4	6.20
Curvuleria species	1	1.50
Aspergillus species	6	9.20
Bipolaris	1	1.50
Penicillium species	1	1.50
Exophiala species	1	1.50
Candida species	4	6.20
Sterile	10	15.40
Total	65	100.00

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