



## Onychomycosis in HIV Infection- A Clinicomycological Profile

### KEYWORDS

Onychomycosis, HIV infection, Mycology

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### ABSTRACT

**Context:** Onychomycosis refers to the fungal infection of the nail bed and secondarily of the nail plate. In HIV infection it is characterized by being clinically more aggressive, with rapid spread to the feet and hands, having higher frequency of proximal white subungual type.

**Setting and design:** The study was conducted for a period of 12 months. During this period a total of 325 HIV positive patients who attended the dermatology out patients department were screened for the features of onychomycosis and 48 clinically diagnosed cases of onychomycosis were selected for the study. 40 HIV negative cases with onychomycosis were selected as controls.

**Aim:** To find out the clinical pattern of onychomycosis in HIV infected individuals with special reference to common site affected, type of onychomycosis and to isolate the pathogens responsible for the disease and to compare it with the control group.

**Methods and Materials:** 48 clinically diagnosed cases of onychomycosis with HIV were taken into study. Nails were examined clinically to find out the pattern of involvement. Nail clippings were subjected to KOH direct microscopy and fungal culture. 40 patients with onychomycosis who were negative for HIV were taken as controls.

*Statistical analysis:* P value was found out using Fisher's exact test

**Results:** Commonest age group affected was 25-34 years (45.80%). Thickening and opacification of nails was the commonest presentation noted. Toe nails either alone or with finger nails affected in 79.15%. Distal and lateral subungual onychomycosis was the commonest clinical type found in 33 (82.5%) patients. Proximal subungual onychomycosis alone was seen in 2(4.16%) and combination in 4(8.33%) patients whereas that was not observed in any of the patients in the control group. Direct microscopy of the nail clipping was positive in 19(39.50%) patients and culture was positive in 15(31.25%). *Trichophyton Rubrum* in 6(40%), *Candida Albicans* in 5(33.33%) were the important pathogens isolated.

**Conclusion:** In our study thickening and opacification of the nail was the commonest nail change with toe nail involvement in most of the cases. PSOM was seen only in HIV with *Trichophyton Rubrum* as the main pathogen.

### Introduction

Onychomycosis refers to a fungal infection of the nail bed and secondarily of the nail plate which can be caused by dermatophytes, candida and non-dermatophytic moulds<sup>1</sup>. Tinea Unguium is infection of the nail bed or nail plates by dermatophytes. Multiple factors predispose to the development of onychomycosis. They are genetic predisposition, exposure of feet to hot and humid conditions for prolonged periods of time, trauma, peripheral vascular disease, immunosuppression and diabetes mellitus etc<sup>2</sup>. The modified classification of onychomycosis is distal and lateral onychomycosis, proximal subungual onychomycosis, white superficial onychomycosis, endonyx onychomycosis and total dystrophic onychomycosis. Proximal subungual type which manifests as whitish discoloration of proximal nail plate is often seen in patients with AIDS<sup>3</sup>. It is characterized by being more aggressive with rapid spread to the feet & hands, having a higher frequency of proximal white subungual type and possible periungual involvement. *Trichophyton rubrum* is usually the cause of superficial white onychomycosis in HIV infected persons whereas immunocompetent individuals the cause is *Trichophyton mentagrophytes*. Therefore it was decided to study the

prevalence of onychomycosis in HIV positive individuals with special reference to common sites affected and type of onychomycosis, to isolate the pathogens responsible for the disease and to compare it with the control group.

### Subjects and Methods

The study was conducted in the skin department, K M C Hospital, Attavar and Wenlock District Hospital, Mangalore. A total of 325 HIV positive patients who attended the dermatology departments of both the hospitals were screened for evidence of onychomycosis. Patients with clinical features of onychomycosis were taken into study. Patients with diabetes, psoriasis, eczema, lichen planus, peripheral vascular disease, hepatitis, patients on previous topical or systemic medication were excluded. Detailed history was elicited with reference to duration, symptoms, history of trauma, infection, occupation and personal habits. Detailed examination was carried out regarding the pattern of involvement of nails. Nail clippings were taken and KOH mount examination was carried out. Specimen was also sent for fungal culture to be incubated in Sabouraud's Dextrose Agar. Chloramphenicol and gentamicin were added to inhibit bacterial growth. All cultures were

examined at the end of 4 weeks before declaring them negative. 40 HIV seronegative patients with clinical features of onychomycosis were selected as controls and nail examination was done and nail clippings were taken from these patients too.

### Results

Totally 325 HIV positive patients were screened for clinical features of onychomycosis. Abnormal appearing nails were present in 48(14.76%) patients of which 40 were males and 8 were females. Another group of 40 HIV negative patients with clinical features of onychomycosis were taken as controls. M:F ratio in the study group was 5:1. The commonest age group affected was 25-34 yrs (45.80%). 50% of the males and 25% of females belong to this group.

The youngest was 25 years and the oldest was 62 years. History of trauma was given by 6(12.5%) patients. Other predisposing factors like wearing of tight shoes leading to a humid microenvironment and exposure to chemicals were present in 4(8.33%) and 2(4.16%) patients respectively. History of walking bare foot was noted in 21(43.75%) patients. None of the 48 patients gave a family history of onychomycosis. Only 4(8.33%) of 48 patients were symptomatic. Thickening and opacification of the nail plate was noted in all patients. The presence of ridging, discoloration, onycholysis and paronychia was observed in 39(81.25%), 30(62.50%), 29(60.40%) and 8(16.60%) patients respectively. 36(75%) patients gave history of involvement of less than five nails. 8(16.6%) patients gave history of mild involvement of nail plate. Moderate and severe involvement was seen in 20(41.60%) patients each.

In the study group toe nails alone were involved in 21(43.75%) patients (Fig:1), finger nails alone in 10(20.80%) and both in 17(35.40%) patients (Table-I).

In the study group Distal and lateral subungual onychomycosis was the most common type which was found in 32(66.66%) patients either alone or in combination followed by total dystrophic type which was found in 14(29.16%) patients. Proximal subungual type alone was present in 2 patients and in combination with other types in 4 patients (Fig:2). And this type was not seen in any patients of control group (Table-II).

In the study group, light microscopy was positive for fungus in 19(39.50%) patients and culture positive in 15(31.25%) patients. The predominant causative organism was trichophyton rubrum seen in 6(40%) patients followed by candida (Fig:3) which was seen in 5(33.33%) patients. In the control group, light microscopy was positive in 16(40%) patients and culture positive in 11(27.50%) patients. The predominant causative organism was trichophyton rubrum seen in 4(36.36%) patients followed by candida which was seen in 3(27.27%) patients (Table-III). Rhizopus and Epidermophyton floccosum were isolated only in HIV positive group (fig:4).

### Discussion

Onychomycosis was seen commonly in younger age group because the younger people are cosmetically more conscious than older ones<sup>1</sup>. Male preponderance may be due to the predisposing factors like occupational related sub clinical trauma. Various predisposing factors like using of tight shoes and trauma have been implicated in the development of onychomycosis<sup>2</sup>. Our patients could have visited and walked bare foot around surfaces which may have a density of fungal spores<sup>3</sup>. In our study 43.75% of patients

had a history of walking bare foot which was the common factor noted. Onychomycosis can be familial with the possibility that some individual have a genetic predisposition to the fungal infection<sup>3</sup>. But none of the patients in our study gave a family history. Onychomycosis can be symptomatic. Gupta et al<sup>3</sup> has observed that a higher portion of patients with onychomycosis were aware of the appearance of their abnormal nail. In our study 8.30% of patients were symptomatic. Thickening and opacification, ridging, discoloration, onycholysis and paronychia have been associated with onychomycosis<sup>4</sup>. Thickening and opacification was the most common nail change observed in our study and was present in all patients. The toe nails were most frequently affected in our study (79.15%). Herranz et al<sup>5</sup> has reported the predominant involvement of toe nails in majority of the HIV positive patients with the big toe being significantly involved. In the control group finger nails were involved either alone or in combination with toe nails in 60% of the patients. Using the Z Test for proportion, clinical Involvement in the study group when compared to the control group was not found to be statistically significant.

DLSO(66.64%) was the most common type noted in the study group. Next common type was TD seen in 12(25%) patients. PSO was seen in 6(12.5%) patients either alone or in combination. No cases of PSO was seen in the control group. This difference was found to be highly significant using Fisher's exact test ( $p=0.0297$ ). Gupta et al<sup>3</sup> found distal and lateral subungual type as the common type followed by WSO and PSO. Gupta et al has stated that when PSO is noted in an individual the possibility of immunocompromised status should be considered. In our control group also DLSO was the most common type seen in 82.5% of patients. Using Fisher's exact test, P value is 0.1430 and not statistically significant. Mycological examination revealed a positive fungal culture in 15(31.25%) patients in study group and 11(27.5%) patients in control group. Gupta et al<sup>3</sup> reported a positive fungal culture in 58% of patients with clinical diagnosis of onychomycosis. He also reported T. Rubrum as the most common causative organism. Hernanz et al<sup>5</sup> have also reported T. Rubrum to be the most common causative organism. This correlates with our study in which T. Rubrum was the commonest organism isolated(40%) followed by candida albicans(33.33%) in the study group. Even in the control group T. Rubrum(36.36%) was the most common organism followed by candida(27.27%). Using Fisher's exact test the results of mycological examination of the study group when compared to the control group was not found to be statistically significant. In our study Rhizopus and Epidermophyton floccosum were isolated only in HIV positive group. Fusarium was isolated in both groups. Penicillium and Aspergillus Niger were isolated only in control group. Gupta et al<sup>3</sup> reported the presence of Aspergillus flavus and Scytalidium dimidiatum in HIV positive group. Cribier et al<sup>6</sup> has reported the presence of Penicillium and Fusarium in the control group. Surjushe A et al<sup>7</sup> reported that 35% had DLSO and 5% had PSO where as 33% had total dystrophic onychomycosis.

### Conclusion

Our study showed a male preponderance with history of walking bare foot as the common predisposing factor. Thickening and opacification of the nail was the commonest nail change with toe nail involvement in most of the cases. DLSO was the commonest clinical presentation and PSO was the nail change seen in only HIV patients. Trichophyton Rubrum was the main pathogen observed, however a prolonged study could reveal the true picture of

this common problem.

**TABLE I  
CLINICAL INVOLVEMENT**

CLINICAL INVOLVEMENT	NO OF PATIENTS (STUDY GROUP)	%	NO OF PATIENTS (CONTROL GROUP)	%	SIGNIFICANCE P Value
TOE NAILS	21	43.75	14	35	P=0.5124 P>0.05 NS
FINGER NAILS	10	20.80	16	40	P=0.0624 P>0.05 NS
TOE&FINGER NAILS	17	35.40	10	25	P=0.3563 P>0.05 NS
TOTAL	48	100	40	100	

**TABLE-II  
CLINICAL TYPE OF ONYCHOMYCOSIS**

CLINICAL TYPES	NO OF PATIENTS (STUDY GROUP)	%	NO OF PATIENTS (CONTROL GROUP)	%	SIGNIFICANCE P Value
DLSO	29	60.40	29	72.5	0.2654
TD	9	18.75	6	15	0.7783
WSO	2	4.16	1	2.5	1.0000
PSO	2	4.16	-	-	0.4984
DLSO+TD+PSO	2	4.16	-	-	0.4984
DLSO+TD	1	2.08	4	10	0.1725
WSO+PSO	1	2.08	-	-	1.0000
WSO+TD	1	2.08	-	-	1.0000
PSO+TD	1	2.08	-	-	1.0000
TOTAL	48	100	40	100	

DLSO- Distal and lateral subungual  
 WS-White superficial  
 TD-Total dystrophic  
 PSO-Proximal subungual

**TABLE-III  
MYCOLOGICAL STUDY**

CAUSATIVE ORGANISM	NO OF PATIENTS (STUDY GROUP)	%	NO OF PATIENTS (CONTROL GROUP)	%
T.RUBRUM	6	40	4	36.36
CANDIDA ALBICANS	5	33.33	3	27.27
E.FLOCCOSUM	1	6.66	-	-
T.MENTAGROPHYTES	1	6.66	1	9.09
FUSARIUM	1	6.66	1	9.09
RHIZOPUS	1	6.66	-	-
PENICILLIUM	-	-	1	9.09
ASPERGILLUS NIGER	-	-	1	9.09

**LEGEND FOR PHOTOGRAPHS**

1. Involvement of all toe nails
2. Proximal subungual onychomycosis
3. Candida albicans
4. Rhizopus



**Fig 1**



**Fig 2**



Fig 3



Fig 4

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