A STUDY ON THE PATTERN OF FUNGI CAUSING ONYCHOMYCOSIS IN A TERTIARY CARE HOSPITAL IN IMPHAL

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ABSTRACT

BACKGROUND

Onychomycosis is a fungal infection of the nails. It is caused by dermatophytes, non-dermatophytes and yeasts. In spite of improved personal hygiene and living condition, it continues to persist and poses a major clinical challenge regarding its treatment due to its chronicity.

The present study was conducted to identify the fungi causing onychomycosis in our region.

MATERIALS AND METHODS

This descriptive study was carried out in the Department of Microbiology at a tertiary healthcare centre in Manipur from August 2016 to August 2017. A total of 166 cases of clinically diagnosed cases of onychomycosis were taken up for study. After disinfecting the nails with 70% alcohol, collected nail samples were subjected to 20% KOH and culture was done on Sabouraud's Dextrose Agar (SDA) with chloramphenicol. Identification of the isolates was done by microscopic and macroscopic examination.

RESULTS

Out of 166 samples KOH is positive in 54 samples (32.54%), of which culture is positive in 30 samples (18.07%) and 24 is culture negative (14.45%). Total culture positivity is seen in 52 samples (31.32%), of which 30 samples (18.07%) is KOH positive and 22 samples (13.25%) is KOH negative. Females are predominantly affected (64.45%). F: M is 1.8: 1. Most affected age group is 21-30 yrs. (30.12%). *Candida* species are the commonest species isolated (46.15%) and non-albicans *Candida* are more predominant (30.76%) followed by dermatophytes (28.84%). *Trichophyton rubrum* is the commonest dermatophyte isolated (15.38%).

CONCLUSION

The study showed the genus *Candida* as the main pathogen causing onychomycosis in our region. So, clinical onychomycosis should be confirmed both by KOH and fungal culture to prescribe specific antifungal drugs for optimal outcome.

KEYWORDS

Onychomycosis, Dermatophytes, *Candida* Spp. Non-Albicans *Candida*.

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BACKGROUND

Onychomycosis is traditionally defined as a fungal infection of the nail.¹ It can be caused by dermatophytes, yeasts or non-dermatophytic moulds.² Onychomycosis constitutes 50% of all nail infections.^{3,4} In spite of improved personal hygiene and living environment, it continues to spread and persist making it an important public health problem.⁵ The aim of our study was to identify the fungal agents causing onychomycosis in our region.

MATERIALS AND METHODS

This study is a descriptive study carried out in the Department of Microbiology at a tertiary healthcare institute in Manipur from August 2016 to August 2017. 166 samples from clinically suspected cases of onychomycosis, which were sent for fungal culture and KOH examination from

Dermatology OPD of our institute during the study period were recruited for study. After disinfecting the nails with 70% alcohol, the nail clippings or scrapings were obtained according to standard procedure. The collected samples were divided into 3 parts. One part was subjected to direct microscopy in 20% KOH solution for the presence of fungal elements. The remaining samples were inoculated into two tubes containing Sabouraud's dextrose agar with chloramphenicol and incubated at 25°C and 37°C respectively for 4 - 6 weeks with intermittent examination of growth in between. Macroscopically, the organisms were identified by colony characters and pigment production on reverse and obverse. Microscopic examination includes Gram staining for yeasts, lactophenol cotton blue staining and slide culture wherever necessary. Further speciation of *Candida* species was done on VITEK-2 Compact system (Biomérieux, France).

RESULTS

Out of the total 166 samples 107 (63.85%) samples were collected from females, while 59 (35.54%) had been collected from males. Female-to-male ratio was 1.8: 1 (Table 1). The most common age group involved was seen in 21 - 30 years followed by 31 - 40 years (Table 2).

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Sex	Number of Cases	Percentage (%)
Male	59	35.54%
Female	107	63.85%

Table 1. Distribution of Sex among the Cases of Onychomycosis

Age Group	Number of Cases	Percentage
0-10 yrs.	5	3.01%
11-20 yrs.	15	9.03%
21-30 yrs.	50	30.12%
31-40 yrs.	30	18.07%
41-50 yrs.	28	16.86%
51-60 yrs.	27	16.26%
61-70 yrs.	7	4.21%
80-90 yrs.	4	2.40%

Table 2. Age Distribution among the Cases of Onychomycosis

Direct microscopy in KOH was positive in 54 samples (32.54%), of which culture was positive in 30 samples (18.07%). Total culture positivity was seen in 52 samples (31.32%), of which KOH was positive in 30 samples (18.07%) (Table 3). From the 52 culture positive samples *Candida* spp. 24 (46.15%) were the predominant group isolated, of which 8 (15.38%) were *Candida albicans* and 16 (30.76%) were non-*albicans* *Candida* (NAC). It is followed by 15 cases (28.84%) of dermatophytes, of which 8 (15.38%) were *Trichophyton rubrum*, 4 (7.69%) were *Trichophyton mentagrophytes* and 3 (1.8%) were *Trichophyton tonsurans*. Non-dermatophytes moulds accounts for 13 cases (25%), of which 3 (5.76%) were *Fusarium* spp., 2 (3.84%) cases each were *Aspergillus niger* and 1 case (1.92%) each of *Scopulariopsis*, *Scedosporium*, *Geotrichum*, *Alternaria* and *Exophiala dermatitidis* (Table 4). Among the NAC, *Candida tropicalis* was predominant with 10 cases (19.23%) followed by *C. guilliermondii* 3 cases (5.76%), *C. glabrata* 2 cases (3.84%) and 1 case (1.92%) of *C. parapsilosis* (Table 5).

Diagnostic Test	Culture Positive	Culture Negative	Total
KOH Positive	30 (18.07%)	24 (14.45%)	54 (32.53%)
KOH Negative	22 (13.25%)	90 (54.21%)	112 (67.46%)
Total	52 (31.32%)	114 (68.67%)	166

Table 3. Microscopy and Culture Positivity among Cases of Onychomycosis

Fungus	Number of Isolates	Percentage
Yeasts		
<i>Candida albicans</i>	8	15.38%
Non- <i>albicans</i> <i>Candida</i>	16	30.76%
Dermatophytes		
<i>Trichophyton rubrum</i>	8	15.38%
<i>Trichophyton mentagrophytes</i>	4	7.69%
<i>Trichophyton tonsurans</i>	3	1.80%
Non-Dermatophyte Moulds		
<i>Fusarium</i> spp.	3	5.76%
<i>Aspergillus niger</i>	2	3.84%
<i>Aspergillus flavus</i>	2	3.84%
<i>Scopulariopsis</i> spp.	2	3.84%
<i>Scedosporium</i> spp.	1	1.92%
<i>Geotrichum</i> spp.	1	1.92%
<i>Alternaria</i> spp.	1	1.92%
<i>Exophiala dermatitidis</i>	1	1.92%

Table 4. Distribution of Fungi among the Cases of Onychomycosis

<i>Candida</i> spp.	No. of Isolates	Percentage
<i>Candida albicans</i>	8	15.38%
<i>Candida tropicalis</i>	10	19.23%
<i>Candida guilliermondii</i>	3	5.76%
<i>Candida glabrata</i>	2	3.84%
<i>Candida parapsilosis</i>	1	1.92%

Table 5. Distribution of *Candida* Species among the Cases of Onychomycosis

DISCUSSION

In the present study, the most common age group affected is 21 - 30 yrs. followed by 31 - 40 yrs., which is in accordance to Veer et al, Rupali S, Shasir W et al and Grover et al.^{4,6,7} People of this age group are more involved in outdoor activities and are prone to fungal infection due to trauma. Moreover, young population are more apprehensive and regarded it as a cosmetic issue and approach clinician on time. Few authors have reported higher prevalence of onychomycosis in elderly age group. But in our study, only 4.21% of patients above 60 yrs. were affected. Children are least affected. Only 3.01% of the patients are found to be in age group of 0 - 10 yrs. This may be because children spend less time in the environment containing pathogens and they have faster nail growth and smaller nail surface for fungal invasion.⁵

In our study, onychomycosis was noted more among the females than among males. Female-to-male ratio was 1.8: 1. This is in accordance to other studies like Arti et al, Ruchita et al, Neupane S et al.⁸⁻¹⁰ This may be because women constantly submerge their hands in water for their household activities. Some studies like Ratna et al, Lone et al have shown greater male preponderance than female.^{11,12}

In most of the studies, dermatophytes are the most encountered organisms in onychomycosis. But in our study the predominant pathogen was *Candida* species (46.15%), of which 8 (15.38%) were *Candida albicans* and Non-*albicans* *Candida* accounted for 16 cases (30.76%). Among the NAC, *Candida tropicalis* was predominant (19.2%) followed by *C. guilliermondii* (5.76%), *C. glabrata* (3.84%) and *C. parapsilosis* (1.92%) respectively. In our study, yeast was more predominant, which is similar to other studies.^{6,13,14} A shift from *Candida albicans* to non-*albicans* has been noted in our study. Among the dermatophytes isolated, *Trichophyton rubrum* (15.38%) was predominant followed by *Trichophyton mentagrophytes* (7.69%) and *Trichophyton tonsurans* (1.80%). This is similar to studies done by Rupali S.⁶ Non-dermatophyte moulds accounts for 25% of the total isolates, of which *Fusarium* spp. was predominant (5.76%). M. Leelavathi et al and Shrijana Gurung et al have also reported similar findings.^{15,16}

CONCLUSION

The present study showed the emergence of *Candida* species as the most common cause of onychomycosis in our region with a shift from *Candida albicans* to Non-*albicans* *Candida*. Thus, there is a need for microbiological confirmation for the cases of onychomycosis to prescribe species specific antifungal for optimal treatment outcome.

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