

Prevalence of Onychomycosis in the Psoriatic Patients in a Tertiary Care Hospital, Chennai, Tamil Nadu, India

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ABSTRACT

Introduction: Psoriasis is a common chronic hyper proliferative skin disorder, with involvement of nail in about 25% patients. Onychomycosis is the fungal infection of the nail which also affects the psoriatic patients and thereby increasing disfigurement of nail in already clinically affected condition.

Aim: To know the prevalence of onychomycosis in psoriatic patient with nail involvement. To determine the mycological profile of onychomycosis in psoriasis patient and to perform the antifungal susceptibility testing for the fungus isolated.

Materials and Methods: A cross-sectional study was done for period of one year in a tertiary care center after obtaining institutional ethical clearance. Nail scrapings were taken after proper disinfection and subjected to KOH and cultured in Sabouraud's dextrose agar and Dermatophyte test medium and

incubated upto four weeks. Tubes which were showing growth were further processed for identification of species and antifungal susceptibility test was done. Tubes which did not show growth at the end of four weeks were reported as no growth.

Results: Total number of samples was 86. We had around 61.62% of males and rest were females. Most of our patients were in the age group of 51 to 70 years. Four out of 86 samples grew fungus of which two were *Candida tropicalis* and *Fusarium oxysporum* and *Alternaria alternata*. There was no dermatophyte isolated. We did not encountered any resistance.

Conclusion: It is better to screen for fungal infection of nails in psoriatic patients with nail involvement. As the fungal infection will cause more destruction and disfigurement, appropriate antifungal therapy if started early will have better clinical outcome.

Keywords: *Alternaria alternata*, *Candida tropicalis*, Dermatophyte, *Fusarium oxysporum*

INTRODUCTION

Psoriasis is a common chronic hyper proliferative skin disorder, with involvement of nail comprising around 25% patients. Psoriasis is seen in 2-3% of world's population [1,2]. It affects more frequently males and its incidence increases with age [3]. Clinically psoriasis is classified into Psoriasis vulgaris (palmoplantar psoriasis), Guttate psoriasis, Unstable psoriasis, Erythrodermic psoriasis, Pustular psoriasis, atypical forms of psoriasis based upon morphology or natural history [4]. Onychomycosis is fungal infection of the nail which also affects the psoriatic patients [3]. Prevalence rate of onychomycosis in psoriatic patients is 4.6-30% [5-8]. Onychomycosis, infection of the nail aperture by fungi can include dermatophytes, non-dermatophytic moulds and yeasts mainly *Candida* species [5]. Dermatophytes infections are mostly due to *Trichophyton rubrum* [1]. The non-dermatophyte moulds account for approximately 4% of onychomycosis, with *Scopulariopsis brevicaulis* as the most frequently isolated [9,10]. Yeasts are the source of approximately 5% of onychomycosis, the majority of which is caused by *Candida albicans* [5,11]. Differentiation between onychomycosis and psoriasis can be difficult because the clinical signs of both conditions are approximately the same. Fungal infection is most commonly seen in immunocompromised conditions. Psoriasis is one of the clinical conditions that necessitate steroid and immunosuppressive agents. A subset of patients with nail psoriasis may have concomitant fungal infections. The aim of this study was to investigate the prevalence of fungal infections in nail psoriasis and their susceptibility pattern.

MATERIALS AND METHODS

A cross-sectional study was conducted from May 2017 to April 2018 (period of 1 year) in collaboration between Department of Dermatology and Microbiology, Sri Ramachandra Medical College and Research Institute after obtaining Institutional Ethical Committee clearance (CSP-MED/17/APR/35/37). All the patients attending

Psoriatic clinic with nail manifestation were included in the study and were screened for onychomycosis. Onychomycosis in non-psoriatic patient were excluded from the study. Informed consent was obtained prior to collection of samples. The nail scrapings were collected after disinfection with 70% alcohol wipes using a sterile surgical blade in a black coloured sterile chart paper. All specimens were subjected to 40% KOH mount to look for fungal elements. Specimens were inoculated in two sets of Sabouraud's Dextrose agar (SDA) tubes with gentamycin and Dermatophyte Test Medium (DTM) with actidione. One set of tube was incubated at 37°C and other set at 25°C. Readings of the tube were taken at regular intervals of 72 hours. Those tubes showing growth were further processed for identification of species. A result was considered positive when direct KOH mount, microscopic examination and growth occurred in culture. Repeat sample from positive fungal culture patients was done to rule out contamination. Yeast identification was done by Gram stain, Tetrazolium reduction medium, Hichrome agar, Sugar fermentation and Assimilation test. Moulds were identified by Lactophenol Cotton Blue Test (LPCB) and Slide culture (riddle's method). Anti-Fungal Susceptibility Testing (AFST) for yeast was done by conventional disc diffusion (Muller Hinton Agar with 2% glucose and a drop of methylene blue) and for moulds by broth micro dilution method as per standard CLSI guidelines CLSI M 44-A2 and 38-A2(2009). Anti-fungal drugs tested were Amphotericin B, Fluconazole, Voriconazole, Itraconazole and Posaconazole. Tubes which did not show growth at the end of four weeks were reported as no growth. All the media and reagents were procured from Himedia Lab Pvt., Ltd.

RESULTS

Demographic Profile

Out of 86 non repeatable patients, with psoriatic involvement of nails, 53 (61.6%) were males and 33 (38.4%) were females. The male to

female ratio is 1.6:1. Age wise distribution of study population is shown in the [Table/Fig-1].

Age in years	Frequency (n=86)
21-30	7 (8.14%)
31-40	19 (22.10%)
41-50	15 (17.44%)
51-60	25 (29.06%)
61-70	20 (23.26%)

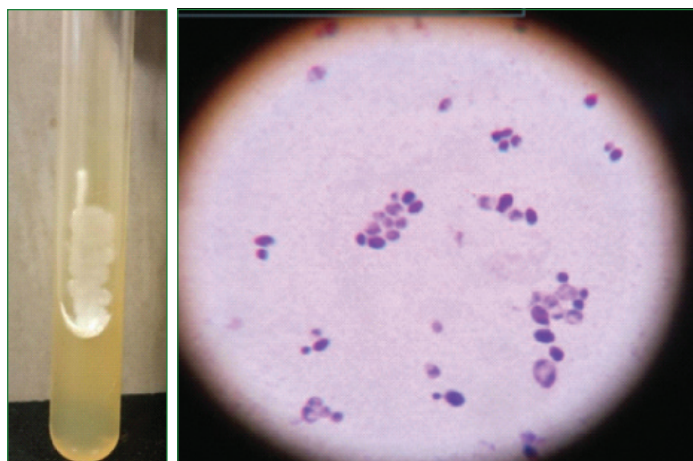
[Table/Fig-1]: Age wise distribution of study population.

Type of Psoriasis

There were 45 patients with palmoplantar psoriasis followed by plaque 24, erythrodermic 11 and guttate psoriasis 6.

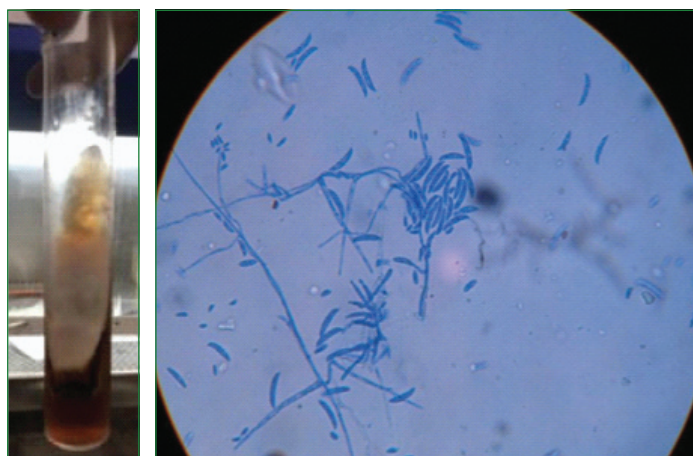
Percentage of Onychomycosis

Four (4.65%) of study patients out of 86 grew a form of yeast and mould. There were (50%) *Candida tropicalis* and (50%) moulds in the form of *Fusarium oxysporum* and *Alternaria alternata* which are depicted in the [Table/Fig-2-7]. There was no contamination found.



[Table/Fig-2]: SDA tube of *Candida tropicalis*.

[Table/Fig-3]: Gram stain-*Candida tropicalis*. (Images from left to right)



[Table/Fig-4]: SDA-*Fusarium oxysporum*.

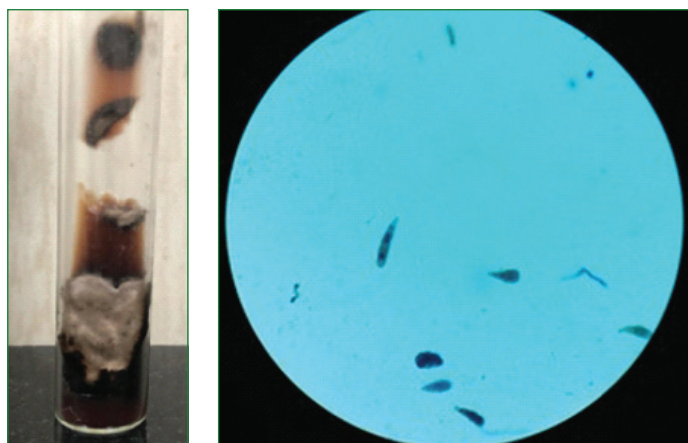
[Table/Fig-5]: LPCB-*Fusarium oxysporum*. (Images from left to right)

Antifungal Susceptibility

Fungus isolated from the study population were sensitive to the all anti-fungal drugs tested and is shown in [Table/Fig-8,9].

DISCUSSION

Nails are epidermal appendages that are often affected in psoriasis. Current study was undertaken with the intention of isolating fungus in nail psoriatic patient and to find out its antifungal susceptibility pattern. Hence we planned to screen for onychomycosis in psoriatic patients. It is reported that 80% of patients with psoriasis



[Table/Fig-6]: SDA-*Alternaria alternata*.

[Table/Fig-7]: LPCB-*Alternaria alternata*. (Images from left to right).

Drugs (Units)	Sensitive	Resistant	Results
Amphotericin-B (100 Units)	>8 mm	<8 mm	14 mm
Fluconazole (25 mcg)	>19 mm	<14 mm	24 mm
Itraconazole (10 mcg)	>8 mm	<8 mm	12 mm
Voriconazole (1 mcg)	>17 mm	<13 mm	18 mm

[Table/Fig-8]: Antifungal susceptibility of *Candida tropicalis*.

Drugs	<i>Alternaria alternata</i> *MIC	<i>Fusarium oxysporum</i> *MIC
Amphotericin-B 16 µg/mL	0.5	0.25
Fluconazole 64 µg/mL	0.125	Intrinsically resistant
Itraconazole 16 µg/mL	0.125	0.5
Voriconazole 16 µg/mL	0.25	0.25
Posaconazole 16 µg/mL	0.25	0.125

[Table/Fig-9]: Antifungal susceptibility of moulds.

*MIC-minimum inhibitory concentration

will present with nail involvement during life time [5]. This is most oftenly seen above the age of 40 years [7,8]. In a study done by Puri A et al., maximum patients (22%) with nail changes were documented in the age group of 51-70 years [12]. Gupta AK et al., and Leibovici V et al., had reported that the incidence of psoriasis increases with age [5,6]. In our study, 45% patients were between the age group of 51-70 years. In the present study male patient (61.6%) were more commonly affected than female patients (38.4%), and this finding correlates with observations of Puri A et al., and Leibovici V et al., which reported male predominance [5,12]. The presence of fungal nail infection and its significance is matter of controversy. Most of the studies done globally reported a prevalence rate of onychomycosis to be 4.6-30% in patient with psoriatic nail disease [5-8]. In the present study we found 4.65% of the 86 psoriatic patients with nail changes had nail fungal infection. Gupta AK et al., and Kacar N et al., had reported 12.7% and 13.1% onychomycosis among psoriatic nails. They had dermatophytes as the major isolate (84.9% and 61.5%) in psoriatic nails [6,13]. There were no dermatophytes isolated in our study. The fast turnover of the nails in psoriasis patients and glycoprotein material present in nail might be inhibitory to dermatophytes [14]. Other case control studies done by Stander H et al., Larsen GK et al., and Staberg B et al., reported 30.5%, 21.5%, and 26.9% onychomycosis among psoriatic nails with high probability of yeast infections 62.2%, 45.5%, and 47.6% respectively [10,15,16]. In our study, 50% of yeast was *Candida tropicalis*. While Szeptowski JC et al., reported 63.1% onychomycosis with non dermatophytes contributing to 50% in psoriatic nails [7]. Pawlaczek M et al., and Hamnerius N et al., reported 6% and 4.6% onychomycosis in psoriatic nails [17,18]. Hamnerius N et al., had reported that there is no differentiation between dermatophytes and non-dermatophytes in psoriatic nails [18]. The prevalence of onychomycosis is fairly high among psoriatic

patients [19]. It is better to rule out onychomycosis for treating psoriasis with immunosuppressive drug as it may aggravate the fungal infection in nail.

LIMITATION AND FUTURE RECOMMENDATION

Since the patients did not come for follow-up the prognosis of the clinical condition could not be evaluated.

A large multicentric study involving different geographical areas, communities with more emphasis on antifungal treatment and resistance pattern will be promising for decreasing the chronicity of disease and better patient compliance.

CONCLUSION

It is better to screen for fungal infection of nails in psoriatic patients with nail involvement. As the fungal infection will cause more disfigurement and disfigurement, appropriate antifungal therapy if started early will have better clinical outcome.

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