ORIGINAL RESEARCH

Rhodotorula: Changing trend of superficial mycosis in Central India

[1]Anushi Hardaha, [2]Shoeb Akhtar Khan, [3]Pranjal Nema, [4]Mansi Gupta, [5]Amardeep Rai

[1]P.G resident, [2]Designate Associate Professor, [4]Demonstrator, [5]Professor, Department of Microbiology, Bundelkhand Medical College, Sagar, M.P, India
[3]Senior Resident, Atal Bihari Medical College, Vidisha, M.P, India

Corresponding author
Mansi Gupta
Demonstrator, Department of Microbiology, Bundelkhand Medical College, Sagar, M.P, India

Received: 28 September, 2023 Accepted: 31 October, 2023

ABSTRACT

Objective: This study was conducted to show the changing trend of superficial fungal infection and to find out the dermatophytic and nondermatophytic pathogenic organism related to this study. **Methods:** In this prospective observational study, 97 non-repetitive, clinically diagnosed cases of Dermatophytosis visiting OPD Dermatology in Bundelkhand Medical college, Sagar were included. Causative agents for superficial mycosis were Dermatophytes, Non-dermatophyte moulds, Yeasts and Yeast-like fungi. The most commonly encountered species are the Dermatophytes, Candida and Nondermatophytes which are on the rise. Rhodotorula(non dermatophyte) is widely distributed fungus that has evolved as an important pathogen, causing fungemias, central nervous system infections. Collected specimens were subjected to standard mycological procedures. **Results:** Mycological analysis of 97 samples showed fungal elements in KOH mount in 45% samples and fungal culture was positive in 61% cases. Of the fungal culture positive cases, Dermatophytes were isolated in 46% cases and Nondermatophyte were isolated in 54% cases (Aspergillus sp (25%), Rhodotorula sp (15%) Candida sp (14%). Superficial mycoses were more common in males (68%) than in females (32%). **Conclusion:** Results from this study and previous studies shows that there is change in trend of superficial mycoses from Dermatophytes to Non dermatophytes with increasing dominance of Rhodotorula.

Keywords: Dermatophytes, KOH wet mount, Fungal culture

INTRODUCTION

Superficial mycoses are common worldwide and predominant in tropical as well as subtropical regions. Superficial mycosis is a common infections affecting human. They nearly affect 20% to 25% of the world's population but the incidence of superficial mycoses continues to increase. Superficial mycoses of skin, nails and hair are among the common fungal infections.[1] They do not cause mortality but their significance lies in their morbidity, recurrence thus creating a major public health problem.

The common agents associated with superficial fungal infections are Dermatophytes, Non-dermatophytes, Moulds, Yeasts and Yeast-like fungi. The most commonly encountered species are the Dermatophytes, Candida and Nondermatophytes which are on the rise.

Rhodotorula (non dermatophyte) is widely distributed fungus that has evolved as an important pathogen, causing fungemias, central nervous system infections among immunocompromised patients. Several studies suggested that Rhodotorula in humans were associated with central venous catheter (CVC) use. The most common underlying diseases included solid and haematologic malignancies in patients who were receiving corticosteroids and cytotoxic drugs, the presence of CVC, and the use of broad-spectrum antibiotics. Unlike fungemia, some of the other localised infections caused by Rhodotorula, including meningeal, skin, ocular, peritoneal, and prosthetic joint infections, are not necessarily linked to the use of CVCs or immunosuppression.

Rhodotorula species is a part of the Basidiomycota phylum which colonise plants, humans, and other mammals. The most important species of genus Rhodotorula known to cause disease in humans includes R. mucilaginosa, R. glutinis, and R. minuta. Rhodotorula produces pink to red colonies and blastoconidia that are unicellular lacking pseudohyphae and hyphae.[2]

Rhodotorula spp. have been recognised as emerging yeast pathogens in humans in the last two decades. While no cases of Rhodotorula infection were reported in the medical literature before 1985.

MATERIAL AND METHODS

This was a Prospective observational Study done in Bundelkhand Medical College, Sagar, Madhya Pradesh, during the time period of June 2021 to June 2022.

A total of 97 clinically diagnosed cases of superficial mycoses attending the dermatology outpatient department (OPD) of a tertiary hospital were enrolled for the study. After decontaminating the affected area, the clinical specimens (skin scraping, epilated hair sample and nail clipping) are collected in a dry sterile black paper.

All specimens (skin, hair and nails) were analyzed for KOH mount and inoculated onto three sets of culture media including Sabouraud Dextrose Agar (SDA) containing chloramphenicol (0.05%) with and without cycloheximide (0.5%) and later examined under LPCB mount(Fig 2) and Gram Staining.

The colonies of Rhodotorula are glistening, creamy-mucoid, showing various shades of pink, red or orange color which is pathognomonic feature.(Fig 1) Further urease test is done for confirmation of fungal species.

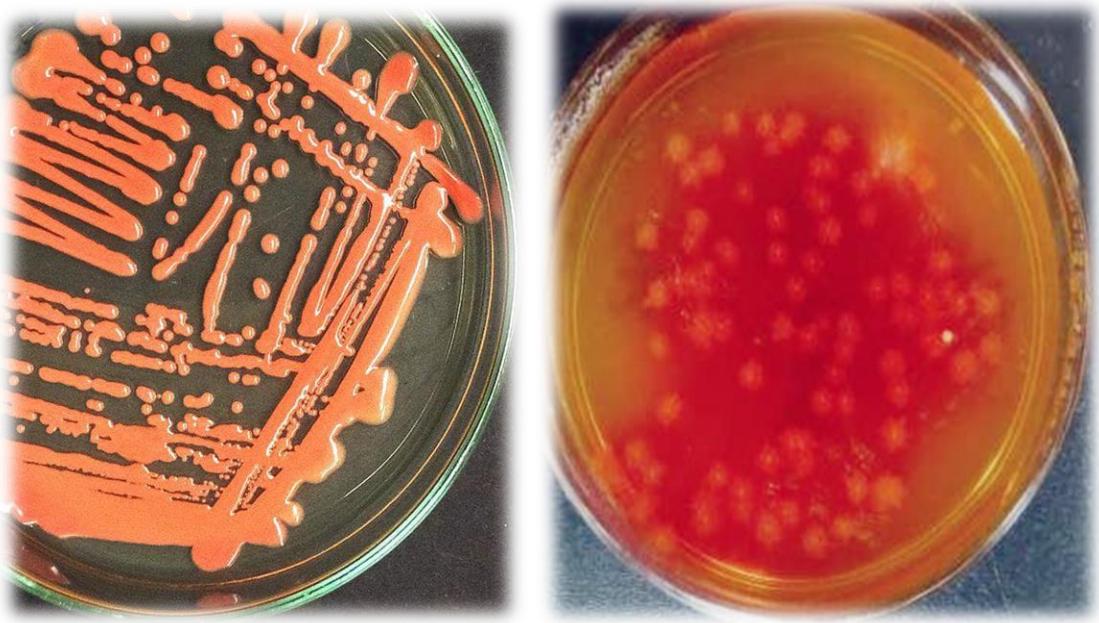

Fig1:- In Rhodoturula spp coral red mucoid colonies with coral red pigmentation on reverse of SDA agar plate

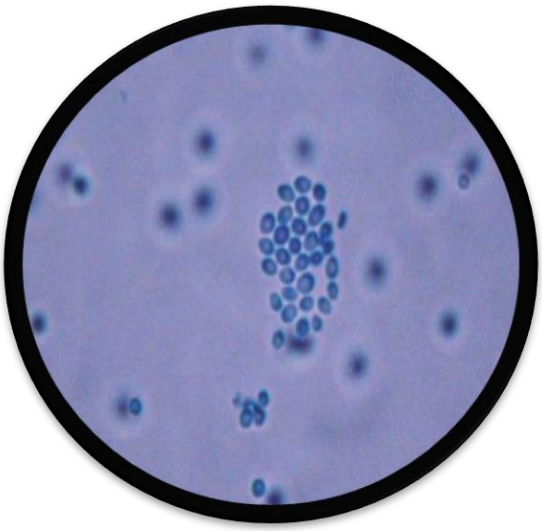

Fig 2:- Rhodotorula species on LPCB mount

RESULT

Mycological analysis of 97 samples showed fungal elements in KOH mount in 45% samples and fungal culture was positive in 61% cases. Of the fungal culture positive cases, Dermatophytes were isolated in 46% cases and Nondermatophyte were isolated in 54% cases (Aspergillus sp (25%), Rhodotorula sp (15%) Candida sp (14%) (Fig 3)

Superficial mycoses were more common in males (68%) than in females (32%). (Fig 4)

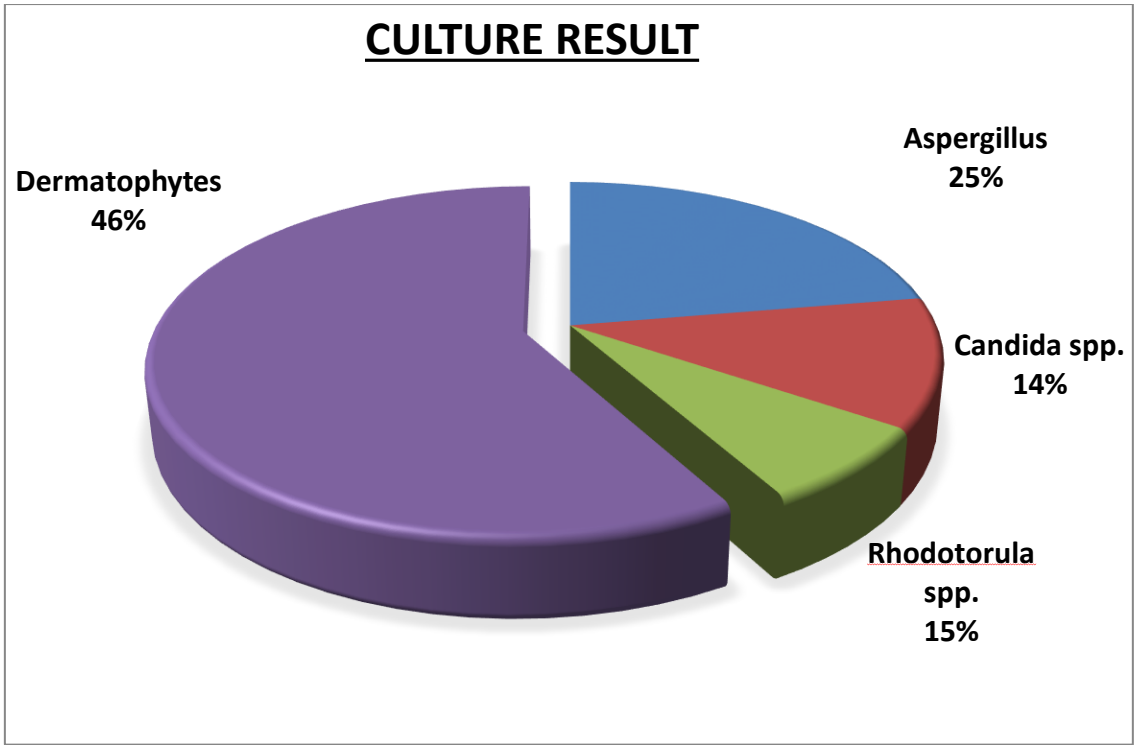

Fig 3:- Distribution of fungal species in culture

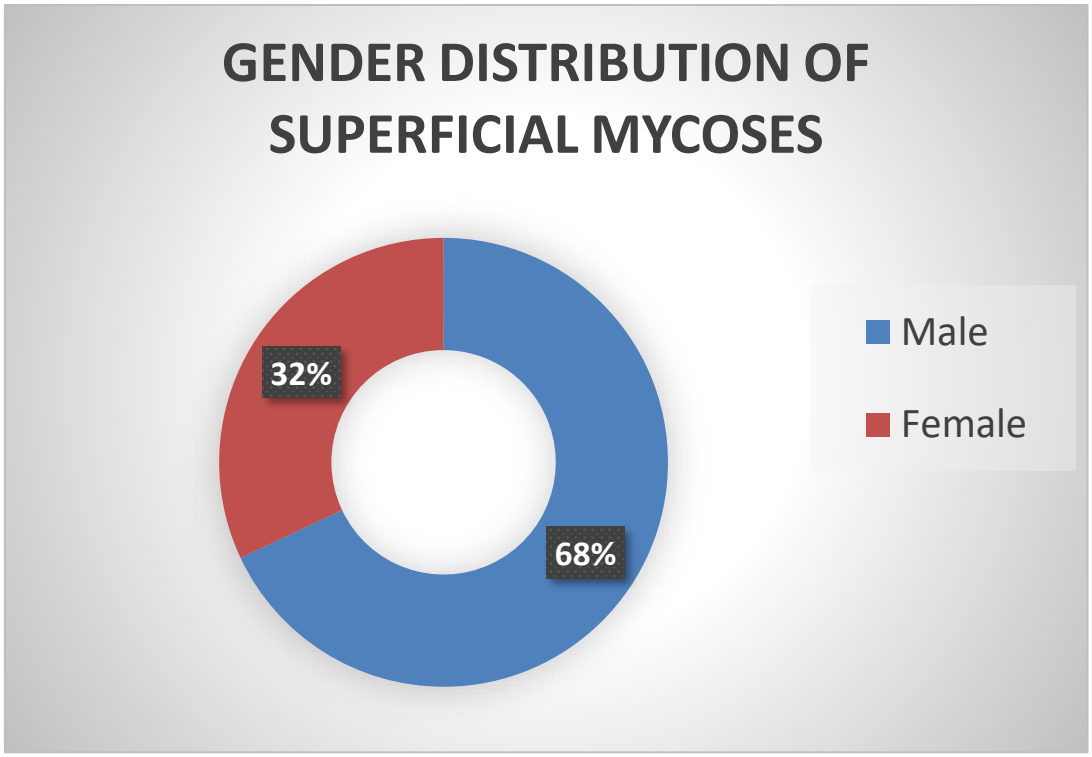

Fig 4:- Gender Distribution of Superficial Mycosis

DISCUSSION

Epidemiology of superficial fungal infection and the causative fungi is seen to vary geographically with time. This study reflects the changing trend of fungal infection with a high rate of isolation of Nondermatophytes like Rhodotorula as the causative agent. In this study, 55% cases were negative for fungal elements in KOH mount but 61% are culture positive. So, detection rate of fungal culture (61%) was higher than direct microscopy using KOH preparation (45%). Our study also correlated with results of Madhavi et al. in 2011 that showed 43% KOH positive and 58% culture positive.[3]

In this study, among the Nondermatophytes (54%) cases detected, *Aspergillus* spp.(25%) were the most common isolates followed by *Rhodotorula* spp. (15%)

and *Candida* (14%). Prasad et al. in 2013 showed that *Aspergillus* spp. (35.1%) were the most common isolates among the Nondermatophytes.[4]

Non dermatophytes infections on skin, though pathogenic role is not certain yet. The possibility of secondary infection has been raised in various research studies. In this study, we have isolated Non dermatophytes on skin using standard mycological technique. In similar ways, various studies as conducted by Grover et al.[6] also reported Non dermatophytes from skin infections.

Previously considered nonpathogenic, Rhodotorula species have emerged as opportunistic pathogens with the ability to colonise and infect susceptible patients.

A study on superficial mycoses by Debeeka *et al.* [5] found the Dermatophyte isolates to be 47.69%, Nondermatophytes to be 55 % of the fungal isolates, which are comparable to this study.

Superficial mycoses were more common in males (68%) than in females (32%). Similar study, conducted by Grover and Roy in 2003,[6] reported superficial mycoses more in males (81%) and less in females (19%) According to Philpot, males may be more vulnerable to infection than females probably due to higher exposure to infection in the schools and in public bath and sporting activities and use of closed type footwear.[7]

CONCLUSION

Epidemiology of superficial fungal infection and the causative fungi is seen to vary geographically with time. This study reflects the changing trend of fungal infection with a high rate of isolation of Nondermatophytes like Rhodotorula as the causative agent.

The infections due to Nondermatophytes are on the rise, which were previously considered as contaminants. Though its primary pathological role in causing skin infections is not yet established.

However, further studies of longer duration with large sample size are needed to comment on present scenario of superficial mycosis.

REFERENCES

1. Ameen M. Epidemiology of superficial fungal infections. *Clinics in Dermatology*. 2010;28(2):197-201.
2. Jagdish chander. Chapter 26. Miscellaneous Opportunistic Mycosis.Textbook of Medical Mycology.3rd Edition. Mehta Publishers 2008;391.
3. Madhavi S., Rao M. V., Jyothsna K. Mycological study of Dermatophytosis in rural population. *Annals of Biological Research.* 2011;2(3):88–93.
4. Prasad N., Mahapatra A., Chayani N. Changing trends in the fungal isolates from clinical specimens of suspected superficial mycoses. *Indian Medical Gazette.* 2013;13(1):60–65.
5. Debeeka Hazarika, Nazneen Jahan and Ajanta Sharma ; Indian J Dermatol. 2019 Jul-Aug; 64: 261–265.
6. Grover S., Roy P. Clinico-mycological profile of superficial mycosis in a hospital in North-East India. *Medical Journal Armed Forces India.* 2003;59(2):114–116.
7. Philpot C. M. Some aspects of the epidemiology of tinea. *Mycopathologia.* 1977;62(1):3–13.