



The presence of dermatophytes and other fungal agents obtained from clinical samples

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Abstract:

In the current study, *T. rubrum* emerged as the predominant isolate from skin scales, accounting for 17 out of 24 cases, which aligns with findings from numerous other studies. This fungus is the most frequently identified agent from the glabrous skin of the body, including the groin folds and feet. *T. mentagrophytes* ranked as the second most common isolate from body sites, with 4 out of 24 cases (16.7%), consistent with previous research. *E. floccosum* was identified in two specimens from the skin, making it the third most common isolate from glabrous skin. *T. violaceum* was the primary isolate from the scalp and scalp hair, with 20 out of 25 cases, and remains the most prevalent agent in tinea capitis cases in India. Additionally, this agent was isolated from one specimen of skin scales. *T. simii*, a zoophilic species, was also isolated from scalp and scalp hair, representing the second most common isolate from this area at 3 out of 25 cases (12%). The overall prevalence of *T. simii* among dermatophytes is noted to be 1%, with a prevalence of 1.4% in tinea capitis reported in Tamil Nadu, India, and as high as 10% in Sri Lanka. *T. rubrum* was the least frequently isolated species from the scalp, with only 2 out of 25 cases, and is recognized as a common agent responsible for glabrous tinea capitis, typically seen in adults. Nail specimens yielded *T. rubrum* (2 out of 4) and *T. mentagrophytes* (2 out of 4), both of which are common pathogens affecting the nails. *Malassezia* spp. were isolated from 22 out of 39 samples (56.4%), with a higher prevalence in chronic cases (14 out of 22, or 63.6%) compared to achromic cases (8 out of 22, or 36.4%). This discrepancy may be attributed to the inclusion of a greater number of chronic pityriasis versicolor cases in the study group. The isolation rate of this agent in the present study appears significantly higher than in a previous study that reported a low culture positivity rate of 27.8%. Among the *Candida* spp., the non-*albicans* group was more prevalent than the *C. albicans* group, likely due to the higher number of HIV patients included in the study.

1. Introduction

Fungi are found globally, yet only a limited number are classified as pathogenic. These pathogenic fungi can lead to infections in both animals and humans. The majority of these agents affect the superficial layers of the skin, with only a small fraction causing systemic infections. Recently, there has been a rise in the occurrence of fungal infections, potentially linked to the increased use of antibiotics, immunosuppressive medications, and

various medical conditions such as organ transplants, lymphomas, leukemias, and human immunodeficiency virus (HIV) infections. Skin infections caused by dermatophytes have emerged as a significant health concern for children, adolescents, and adults. It is crucial to distinguish between mycetoma caused by filamentous fungi (Eumycotic mycetoma) and that caused by filamentous bacteria (Actinomycotic mycetoma) through culture studies. Accurate diagnosis is vital for initiating the correct treatment and is also

essential for epidemiological tracking. In cases of immunosuppression, identifying these agents is critical for the effective management of mycoses to prevent further complications. This study was conducted to isolate various fungal agents responsible for mycoses in patients visiting the mycology section of the Department of Dermatology at Madras Medical College, which serves an average of 7000-8000 new outpatients annually.

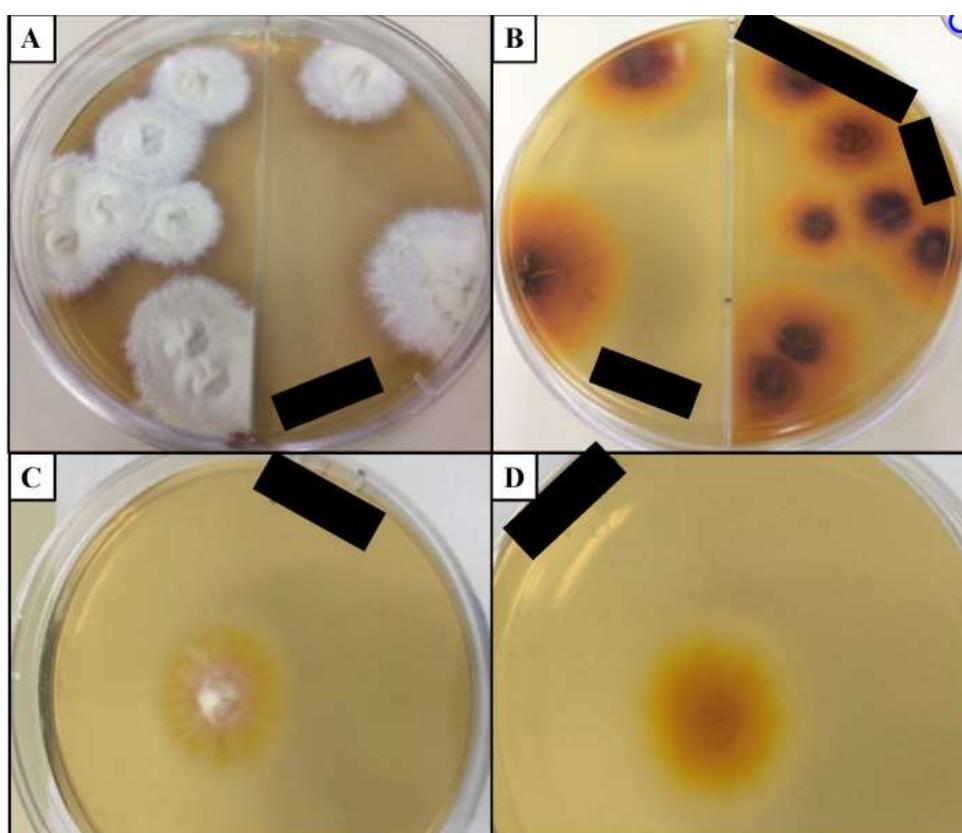
A direct microscopic analysis was conducted using a 10% potassium hydroxide (KOH) wet mount for specimens including skin scales, pus crust, biopsy tissue, and grains, while a 40% KOH solution was utilized for hair and nail specimens. Grains of mycetoma were also analyzed using Gram stain and modified Ziehl Neelsen stain (1% H₂SO₄). For culture studies, KOH positive cases underwent a culture examination, where the scraping site was aseptically cleaned with 70% ethanol, and the scales were collected on a sterile slide using a sterile scalpel. Cultures were performed on two distinct sets of antibiotic-enriched Sabouraud dextrose agar (SDA) media, one containing chloramphenicol at 50 mg/L and the other containing cycloheximide at 500 mg/L, in addition to chloramphenicol. The culture tubes were incubated at 30°C, and growth was monitored, with tubes being discarded only after six weeks in the absence of growth. Mycological identification was based on both macroscopic and microscopic evaluations of the culture isolates, with the macroscopic examination of dermatophytes characterized by growth duration, surface morphology, and pigmentation. Production was conducted in reverse. Commeal agar (CMA) was utilized to differentiate *Trichophyton rubrum* from *T. mentagrophytes* based on pigment production in the media. Furthermore, hair perforation studies were performed to distinguish between these two species. The microscopic examination of fungal growth was conducted using lactophenol cotton blue stain. The characteristics of mycelium and conidia formation (both macro and micro conidia) facilitated the differentiation of various genera and species. Budding yeast cells of *Candida* spp. were identified microscopically. *Candida* species were categorized into *albicans* and non-*albicans* groups based on the production of chlamydospores on corn meal agar and the formation of germ tubes. Olive oil (2%) was applied to the media for the isolation of *Malassezia* spp. in clinically diagnosed cases of pityriasis versicolor. Plain SDA medium was employed in cases of pityriasis versicolor as well as for mucorales and eumycotic species. Lowenstein-Jensen medium was utilized for the primary isolation of agents responsible for actinomycetoma.

Eumycotic agents were confirmed through microscopic observation of their morphology and conidial development. In the current study, *T. rubrum* emerged as the predominant isolate from skin scales, accounting for 17 out of 24 cases, which aligns with findings from numerous other studies. This fungus is the most frequently identified agent from the glabrous skin of the body, including the groin folds and feet. *T. mentagrophytes* ranked as the second most common isolate from body sites, with 4 out of 24 cases (16.7%), consistent with previous research. *E. floccosum* was identified in two specimens from the skin, making it the third most common isolate from glabrous skin. *T. violaceum* was the primary isolate from the scalp and scalp hair, with 20 out of 25 cases, and remains the most prevalent agent in tinea capitis cases in India. Additionally, this agent was isolated from one specimen of skin scales. *T. simii*, a zoophilic species, was also isolated from scalp and scalp hair, representing the second most common isolate from this area at 3 out of 25 cases (12%). The overall prevalence of *T. simii* among dermatophytes is noted to be 1%, with a prevalence of 1.4% in tinea capitis reported in Tamil Nadu, India, and as high as 10% in Sri Lanka. *T. rubrum* was the least frequently isolated species from the scalp, with only 2 out of 25 cases, and is recognized as a common agent responsible for glabrous tinea capitis, typically seen in adults. Nail specimens yielded *T. rubrum* (2 out of 4) and *T. mentagrophytes* (2 out of 4), both of which are common pathogens affecting the nails. *Malassezia* spp. were isolated from 22 out of 39 samples (56.4%), with a higher prevalence in chronic cases (14 out of 22, or 63.6%) compared to achromic cases (8 out of 22, or 36.4%). This discrepancy may be attributed to the inclusion of a greater number of chronic pityriasis versicolor cases in the study group. The isolation rate of this agent in the present study appears significantly higher than in a previous study that reported a low culture positivity rate of 27.8%. Among the *Candida* spp., the non-*albicans* group was more prevalent than the *C. albicans* group, likely due to the higher number of HIV patients included in the study.

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