Case Series

# A Case series of Tinea corporis caused by *Microsporum audouinii*: sharing is not always caring

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## ABSTRACT

Tinea corporis caused by *Microsporum audouinii* is reported herein from two Indian adult females of age 27 and 33 years who are sisters. The fungus was reported from both based on microscopic and culture findings. Both cases had a satisfactory response to the ketoconazole and tolnaftate combination. Infections by this dermatophyte barring tinea capitis are few and far between and hardly reported. Hence, this is an exquisite case series to be reported in the literature. This report also highlights measures to be taken to prevent the transmission of fungal mold through fomites.

**Key words:** Ketoconazole, *Microsporum audouinii*, Tinea corporis, Tolnaftate

Dermatophytes are filamentous fungi that can invade and thrive on keratinized substrates such as skin, hair, and nails. "Tineas" are infections caused by dermatophytes. Tinea corporis is an infection of the chest, face, arms, and or legs. Although causing infections worldwide, dermatophytosis is more prevalent in tropical countries due to hot and humid weather [1]. Its prevalence depends on host and environmental factors (temperature and humidity), demographic factors and occupation of the patient, genetic predisposition, and socio-economic status [2]. *Microsporum audouinii* is established as a causative agent of tinea capitis in various parts of the world [3]. It is also emerging as the causative agent of dermatophytosis in association with *Microsporum gypseum* complex (also known as Nanninzia complex), thus emerging as the causative agent of dermatophytosis worldwide [4]. However, in India, currently, the predominant dermatophyte is *Trichophyton mentagrophyte* followed by *Trichophyton rubrum* and *Microsporum gypseum* and the most frequent infection is tinea corporis [2]. Cases of tinea corporis caused by *M. audouinii* are scarce and hardly ever reported from India.

Hence, this case series highlights the importance of species identification among limited resources and re-emphasizes the transmission of these fungi through fomites.

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## CASE REPORT

### Case 1

A 27-year-old female residing in Mumbai, single, and working as a typist in our hospital, presented with a history of lesion on the right cheek that has been itching for 1 year. She was prescribed luliconazole cream for 4 weeks for local application yet the lesion persisted. Her sister, who is 33 years old, residing in a village in Hyderabad for 5 years, visits her intermittently and they share clothes. She presented with multiple itchy lesions over the hands, legs, inguinal area, and back for 2 years. The patient does not have comorbidities or a history of travel elsewhere.

On examination, the lesion of the patient was on the right-sided cheek above the angle of the jaw. It was red, well-defined, circular, around 8 cm × 8 cm, erythematous, scaly plaque with a red raised border with the peripheral trailing scale with the free edge of scale pointed inwards (Fig. 1a). 10% potassium hydroxide (Koh) mount from the skin scrape of the lesion showed septate hyphae. Fungal culture was done on sabouraud dextrose agar (SDA) without and with antibiotics (gentamicin, chloramphenicol, and cycloheximide), and plates were incubated at 37°C and 24°C, respectively. After 10 days, there was growth of mold on both plates, which was small, white, and flat with a cottony surface. On further incubation, the growth increased in size and became salmon colored with reddish brown reverse (Fig. 2). Lactophenol cotton blue (LPCB) mount from colonies

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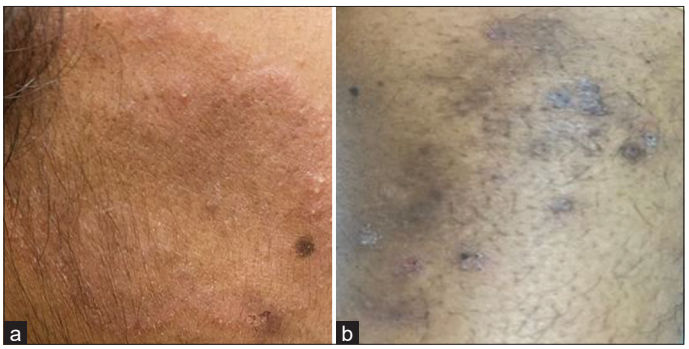


**Figure 1: (a) Lesion on the face of the first patient, (b) lesion on the leg of the second patient**

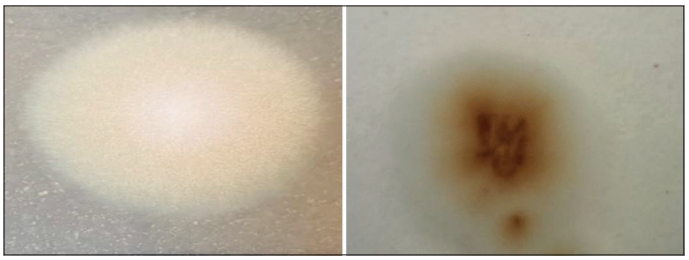

**Figure 2: Colony from both cases showing cottony growth and reddish-brown pigment on reverse**

showed septate hyphae with occasional thick-walled terminal chlamydospores. Macroconidia were large, multicellular, and rough-walled. Occasional microconidia were seen (Fig. 3). Slide culture using potato dextrose agar (PDA) also showed the same findings. The fungus was identified as *M. audouinii*. Based on the culture report, she was given a combination of ketoconazole and tolnaftate for local application for 4 weeks after which the lesions improved and did not recur till 3 months.

### Case 2

A 33-year-old female, married, homemaker residing in a village in Hyderabad for 5 years, and sister of the above-mentioned patient presented with multiple itchy lesions over the hands, legs, inguinal area, and back for 2 years. She intermittently visits her sister residing in Mumbai and they share clothes. She was prescribed antifungal cream containing clobetasol and beclomethasone for local application for them after which they subsided but recurred after stopping it. She was also given oral fluconazole 150 mg weekly for 4 weeks, but of no help. A history of similar lesions was given by her father-in-law, who stays with her. She does not have comorbidities or a history of travel elsewhere.

On examination, the lesion was present on the left leg and was irregular, with multiple black areas in the center and an erythematous and scaly margin (Fig. 1b). She had black patches on the back and hands as well. 10% Koh mount from the skin scrape of the site showed septate hyphae. Fungal culture was done on SDA without and with antibiotics (gentamicin, chloramphenicol, and cycloheximide), and plates were incubated at 37°C and 24°C, respectively. After 10 days, there was growth of mold on both plates, which was small, white, and flat with a cottony surface.

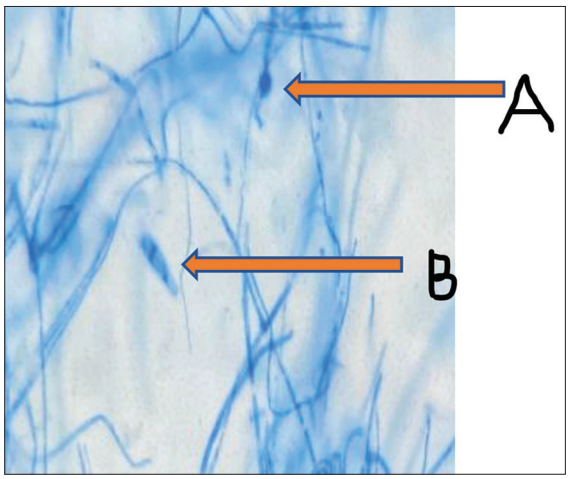


**Figure 3: (A) Lactophenol cotton blue mount from the growth of both patients showing terminal chlamydospores, (B) macroconidia**

On further incubation, the growth increased in size and became salmon colored with reddish brown reverse (Fig. 2). LPCB mount from colonies showed septate hyphae with occasional thick-walled terminal chlamydospores. Macroconidia were large, multicellular, and rough-walled. Occasional microconidia were seen (Fig. 3). Slide culture using PDA also showed the same findings. The fungus was identified as *M. audouinii.* She was given a combination of ketoconazole and tolnaftate for local application for 4 weeks after which the lesions improved and did not recur till 3 months

## DISCUSSION

Various agents, hosts, and environmental factors are involved in dermatophytosis. Agent factors such as local geographic and socioeconomic conditions contribute to the transformation of species [5]. Kaur *et al*. in their study noted *Trichophyton tonsurans* as the most prevalent organism causing dermatophytosis in North India than from any other part of the country [6]. Hot and humid climate predisposes to the acquisition and maintenance of dermatophytosis similar to both our patients who hail from such places [1]. Site of infection, host skin barrier and difference in composition of keratin also play a role [5,7].

Dermatophytosis generally involves adults and is increasing in women similar to both these patients. Anatomical areas like skin folds are more prone [8], as was seen in the patient's sister as she had a history of infection in the inguinal area. Transmission through indirect contact is mostly involved as an environmental factor [5]. In this scenario too, there was a history of sharing clothes among both patients. Many family members are affected simultaneously [2]. In the second case too, a family member of the second patient was simultaneously affected. Prolonged use of topical steroids causing local immunosuppression and reinfection due to early discontinuation may play a role in *M. audouinii* infections [5]. The second patient too gave a history of steroid application frequently. Tinea corporis is the most common infection caused by dermatophytes in India, as observed by Vidhya *et al*., analogous to this case [9].

There has been a crescendo of dermatophytosis cases in the past few years, which are chronic, relapsing, and recurrent, becoming bothersome [2,8]. Similarly, the duration of infection of the first patient ran into a year and that of the second patient extended to a couple of years.

In India, the common species noted are *T. rubrum*, followed by *Trichophyton mentagrophytes* and *M. gypseum* [2]. Out of the various species of *Microsporum*, *Microsporum canis* causes dermatophytic infections worldwide and to a lesser extent, in India [10]. *M. gypseum* is also involved globally, including India [4,2]. *M. audouinii* has emerged as the causative agent of tinea capitis in Europe due to immigration [11] and is endemic in Africa [12]. History of contact with positive cases was present in nearly half of such patients in Africa [12]. A case of tinea corporis caused by this species has been reported by a woman from Germany who had worked in Ghana [13]. Due to species evolution caused by changes in local climatic conditions, *M. audouinii* once considered to be one of the leading causes of dermatophytosis, is now restricted to lesser-developed areas [5]. This could probably be the reason for the scarcity of Tinea corporis caused by this fungus globally. Another reason could be the unavailability of confirmation methods.

Diagnosis of dermatophytes is done by microscopy, culture, histology, and molecular assays based on DNA. Speciation is important for adequate treatment. Microscopy and culture were considered to be the gold standard but has limitations [1]. However, due to finite resources, identification up to species level was given based on microscopy, fungal growth characteristics and morphology, the structure of macroconidia, history of steroid abuse, and expertise of the microbiologist reporting it.

Regarding systemic therapy, oral itraconazole is the drug of choice for tinea corporis caused by common dermatophytes, with fluconazole being an alternative [2,14]. Das *et al*. observed that among the topical antifungals, luliconazole is the most effective and clotrimazole the least [14]. The first patient was given a local application of luliconazole to begin with, but the lesions persisted. The second patient was given oral fluconazole and a combination of clotrimazole and steroids for local application. The reason both did not respond initially is because the causative agent was an unusual fungus. Furthermore, chronic application of steroids in the second case may have led to toilsome infection. In all probability, this chronic infection from the second to first patient was passed through fomites. The possibility also prevails that the same fungus must have been transmitted between the second patient and her family member as he too gave a similar history. Later, based on the culture report, the treatment of both patients was modified by giving a drug containing ketoconazole for local application, which is a broad-spectrum antifungal, and hence both retorted. Although griseofulvin is the drug of choice for *Microsporum* species [11], both these patients were given an antifungal of a broader spectrum as the history of lesions was long-standing, and thus the patients had already undergone significant distress socially, emotionally, and financially. Besides, resistance to griseofulvin in this species has been described [4].

Both these patients were sharing clothes, and washing of the shared clothes was done in a routine manner. Infected patients should avoid sharing clothes and they should be washed and stored separately to reduce the chances of transmission of fungus [2]. Dry cleaning remains an option but may be expensive [2]. In case clothes are shared, routine washing of clothes, especially using water at room temperature, may not be effective as fungal spores are not destroyed by it. Hot water, higher than 30°C is effective for killing fungal spores. Pre-soaking the clothes for half an hour in bleach may help in destroying the mycelia. Hence, the use of bleach along with hot water for washing remains an option [15].

## CONCLUSION

This is a tale of chronic fungal infection by a peculiar dermatophyte imparted from a lady to her sister through sharing of fomites. It draws attention to certain aspects of fungal infections and their diagnosis. Fungal culture is of utmost importance so that a rare isolate is not lost and treatment is effective. Confirmation of the fungus by physiological tests or molecular-based assay was not done due to unavailability. In such a situation with limited resources, proper microscopy and culture techniques, along with the competence of the microbiologist reporting it go a long way in reducing the torment of the patient. These cases too were diagnosed based on similar principles and reported so that they are given heed to. Insistence persists in raising personal hygiene levels, especially halting the sharing of fomites and washing of clothes using hot water.

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