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Original Research Article

Study to Determine the Cause of Recalcitrant Tinea: A Prospective Case Study of 100 Recalcitrant Tinea Cases from South India

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Conflict of interest: Nil

Abstract:

Background: Dermatophytic infections are running a chronic course worldwide either due to ineffective treatment or emerging drug resistance. This study was conducted to identify the various factors causing recalcitrant dermatophytosis of the skin in patients attending our dermatology outpatient department.

Methods: Patients of age group 20-60 years with recalcitrant tinea corporis and cruris (relapse of tinea 1month after stopping the treatment or absence of clinical/mycological cure after 1month of treatment) were included in the study. After detailed history and clinical examination scrapings were taken from the lesions and were examined using 10% KOH under microscope for fungal elements. The scrapings were also sent for culture on Sabouraud dextrose agar for 4weeks.

Results: Most common age group involved is between 20-30 years. History of triple combination creams prior/ during antifungal treatment was seen in 38% cases. History of occlusive clothing was seen in about 78% cases. History of working in humid conditions was seen in 64% cases. History of atopy was seen in about 14% cases. Family history was positive in 20% of the cases. The associated comorbidities like diabetes mellitus, obesity, hyperhidrosis was seen in 31 % cases and the most common associated co-morbidity-is obesity with diabetes. Out of 100 samples, KOH mount was positive for fungal elements in only 69% of patients. Fungal culture on SDA agar was positive in 62 out of 69 KOH positive samples and 22 out of 31 KOH negative samples. In 16 samples no growth was identified. Most common isolated species was Trichophyton mentagrophytes.

Keywords: Recalcitrant Tinea, South India, Dermatophytic Infections.

Introduction

Dermatophytes are pathogenic fungi that have the capacity to invade keratinized structures such as skin, hair, and nails. These infections are known as dermatophytoses and are caused by species of three genera – Trichophyton, Epidermophyton, and Microsporum. Based on their natural habitat, they are classified into three groups – geophilic, zoophilic, and anthrophilic species.

Dermatophytoses are one of the most common skin diseases that have been largely simple to treat. However, in recent years, these infections have become recalcitrant to treatment which can possibly be due to antifungal resistance and many other social and demographic conditions. The aim of this study was to determine the causes of recalcitrant dermatophytosis among the patients presenting to a tertiary care centre in South India.

Materials and Methods

Inclusion Criteria

1. Patients of recalcitrant tinea affecting trunk, limbs and face (relapse of tinea 1month after stopping the treatment or absence of clinical/mycological cure after 1month of treatment)
2. Patients of age group 20-60 years were included in the study.

Exclusion Criteria

1. Patients on immunosuppressive drugs.
2. Tinea affecting hair and nails

Methodology: Detailed history and clinical examination was done. History was taken regarding use of triple combination creams, use of occlusive clothing, working in humid environment, family history of dermatophytic infection, history of

associated comorbid conditions and history of atopy either in the patient or in the family members. The patient was made to sit in the good source of light and proper clinical examination of the lesions was done which included number of lesions, site, presence of scaling, presence of steroid induced atrophy or telangiectasia and presence of inflammatory margin.

Proper sterilization and aseptic conditions were maintained to minimize contamination. After cleansing the selected lesion with alcohol, sufficient clinical material was collected from the lesions on filter paper as transport medium. The scrapings were examined on 10% potassium hydroxide mount for fungal elements and also the samples were cultured.

Culture was done by inoculating on Sabourauds dextrose agar with gentamycin and cycloheximide (to prevent the growth of non-pathogenic dermatophytes). Test tubes were incubated at 28^0c for 4 weeks. Identification of dermatophytes and species was done by colony morphology and microscopy on lactophenol cotton blue mount of the cultures.

Results

Most common age group involved is between 20-30 years which accounted for 55%, 25% belongs to 30-40 years age group , 14% belongs to 40-50 years group and 6 % belongs to 50-60 years age group. Most common clinical spectrum is Tinea corporis (58%) followed by tinea cruris (24%) (Table 1). History of triple combination creams prior/ during antifungal treatment was seen in 38% cases. History of occlusive clothing was seen in about 78% cases. History of working in humid conditions was seen in 64% cases. History of atopy was seen in about 14% cases.

Out of the 100 cases, primary infection was seen in 46 patients with first episode not responding to 1month of antifungal therapy. Remaining 54 patients had recurrent infection 1month after stopping the antifungal therapy. Family history was positive in 20% of the cases. The associated comorbidities like diabetes mellitus, obesity, hyperhidrosis was seen in 31 % cases and the most common associated co-morbidity-is obesity with diabetes. Out of 100 samples, KOH mount was positive for fungal elements in only 69% of patients and negative in 31% patients. Fungal culture on SDA agar was positive in 62 out of 69 KOH positive samples and 22 out of 31 KOH negative samples. In 16 samples no growth was identified. Most common isolated species out of the 84 positive cultures was Trichophyton mentagrophytes (56) followed by Trichophyton rubrum (20), Epidermophyton floccosum (5) and Trichophyton verrucosum (3)

Table 1: Distribution of clinical types

Clinical Type	Number of Cases
Tinea Corporis	58
Tinea Cruris	24
Tinea Pedis	6
Tinea Manuum	6
Tinea Faciei	5
Tinea Barbae	1

Table 2: Colony morphology and microscopy of dermatophytic species

Species	Colony Morphology	Microscopy
Trichophyton mentagrophytes	white-tan, powdery or cottony colonies [5]	Clusters of microconidia and few cigar shaped macroconidia.
Trichophyton rubrum	velvety colonies with red pigmentation [6]	tear drop shaped microconidia
Epidermophyton floccosum	Powdery, buff yellowish colonies which may be raised or folded in the centre [7]	thin walled club shaped macroconidia
Trichophyton verrucosum	flat white or cream coloured colonies with a glabarous textrure [8]	tear shaped microconidia and few bean shaped macroconidia.

Table 3: Comparison of present study with previous studies

	Our study	Patwardhan et al [9]	Sowmya et al [10]	Bindu et al [11]	Sumana et al [12]	Neetu et al [13]
No. of patients	100	175	85	150	100	120
Age group	20-60 years	20-30 years	20-40 years	11-20 years	11-30 years	31- 40 years
Most common clinical type	T. corporis	T. corporis	T. corporis	T. corporis	T. corporis	T. corporis
Most common species	Trichophyton mentagrophytes	T. rubrum	Trichophyton mentagrophytes	T. rubrum	T. rubrum	T. rubrum

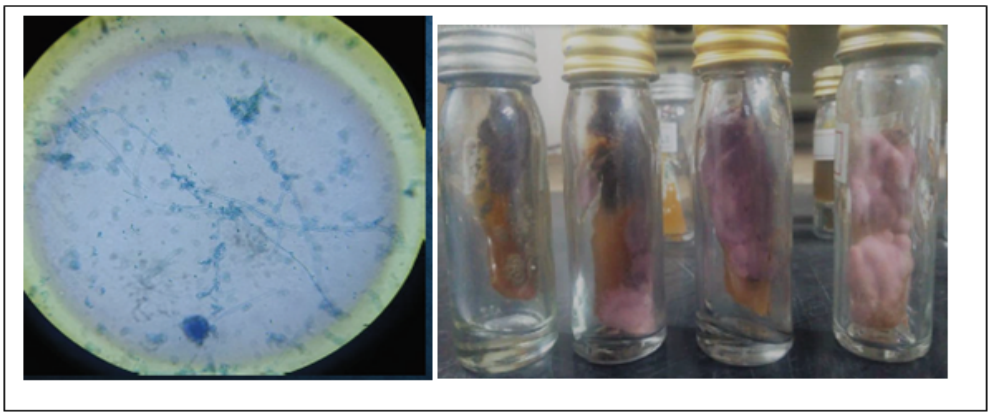

Figure 1: microscopy and colony morphology of Trichophyton rubrum

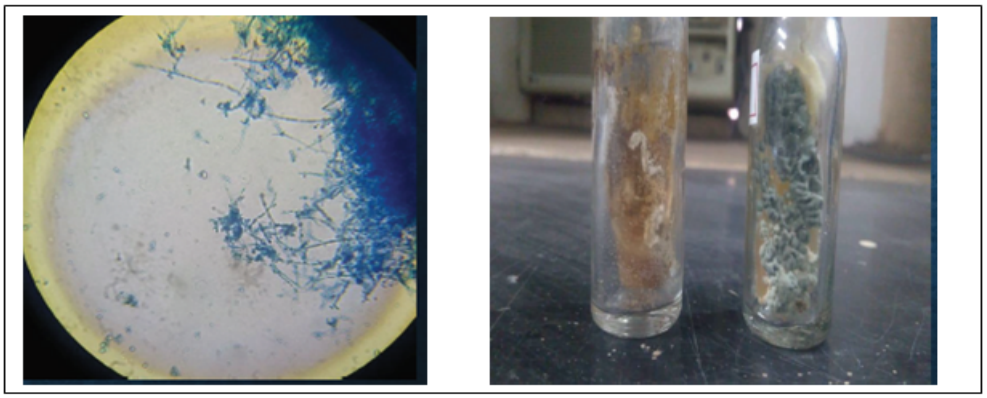

Figure.2 microscopy and colony morphology of Trichophyton mentagrophyte

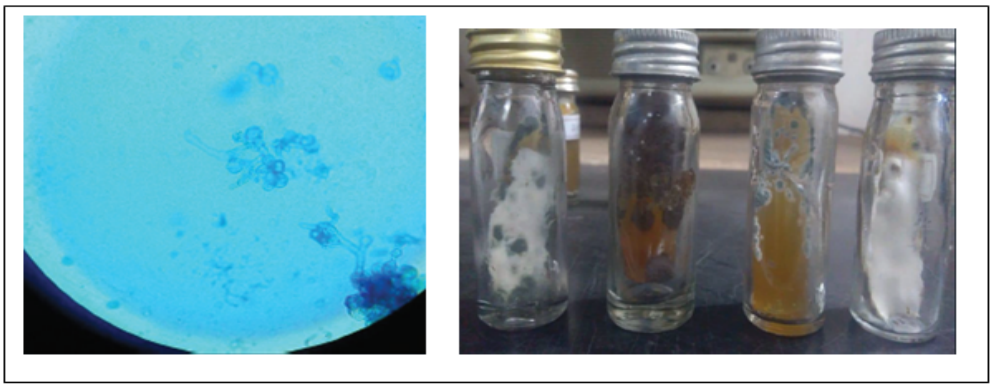

Figure 3: microscopy and colony morphology of epidemophyton

Discussion

Dermatophytosis is the most common superficial cutaneous infection seen in humans. Fungal infections of the skin are more common in India being a tropical country and due to favorable climatic conditions like high temperature and humidity [1]. The prevalence of dermatophytes mainly depends on the personal habits of the individuals, living conditions, geographical variations and with the passage of time [2]. Predisposing factors facilitating the recalcitrant infection are as follows- humidity, maceration, occlusive clothing, minor skin trauma, walking bare foot, etc. Based on the ecological characteristics they are divided into three categories-Anthropophilic, Zoophilic and Geophilic.

The anthropophilic species infect human beings exclusively. Infections caused by the anthropophilic species are chronic and intractable. The inflammation is minimal, and is difficult to treat. The zoophilic species inhabits animals and birds [3]. The geophilic species are isolated from soil. Infection caused by zoophilic and geophilic species generally tend to be self-healing and the severe inflammation, but the response to treatment is good. Trichophyton mentagrophytes and Trichophyton rubrum are both anthopophilic and zoophilic species. Trichophyton verrucosum is a zoophilic species. Epidermophyton floccosum is

anthropophilic species [4]. Species identification is based on colony morphology and microscopic examination on lactophenol cotton blue mount in which each species can be identified based on specific characteristics based on microconidia and macroconidia. Cultural characteristics and microscopy of each species is depicted in (Table 2; Figs. 1 - 3).

In our present study we tried to evaluate and determine the causes of recalcitrant dermatophytosis. Earlier studies from India reported trichophyton rubrum as the most common species causing dermatophytosis (Table 3). In our present study trichophyton mentagrophytes is the most common species isolated. The changing trend of causative organism might be one of the causes for the recalcitrant dermatophytosis. KOH examination must be complimented by fungal culture in KOH mount negative cases. The fungal culture though specific may result in false negative cases. In the present study the culture was positive in 22 cases where KOH is negative.

The use of triple combination creams was seen in 38% cases which is alarming. Indiscriminate used of triple combination creams and the replacement of betamethasone with clobetosol in these triple combinations has contributed to the resurgence of superficial fungal infections. The cost regulation on betamethasone brought down by government further adds on to the existing menace of steroid abuse. Now day's unusual patterns of tinea are commonly observed due to changing social and cultural practices (involvement of penis, large patches almost in bathing trunk distribution, pseudo-circinate patterns, tinea faciei). Use of occlusive clothing by people due to modernization could be one of the potential causes. In the present study, 78% of the sample used occlusive clothing. India being a tropical country and south India being a humid part contributes to the persistence of superficial fungal infections and further adds on the sweat component and habit of occlusive clothing.

In this study obesity coexisting with diabetes mellitus is the most common associated comorbidity in the patients presenting with resurgence. Persistence of fungal elements in the occlusive skin folds and difficult to reach areas may contribute to the relapse and failure to treatment. The Ping pong effect as seen in scabies is seen now a days with dermatophytosis. This is explained by family members effected with same disease in majority of the cases. The spread of dermatophytes by contact and through fomites contribute to the ping pong effect. Inadequate treatment due to high cost-factor leads to persistence of fungal elements resulting in resurgence. Thus, we postulate that mandatory negative mycological examination is important to release the patient from treatment. More-over itraconazole is being used in many subcutaneous and deep mycosis more rampantly further contributes to drug resistance.

Modification of host factors such as weight reduction, hygiene, wearing loose cotton clothes, washing clothes with hot water, proper drying and ironing of clothes, avoidance of sharing items/ clothes/towels/footwear helps to prevent transmission of infection. Counselling the patient regarding all these measures and medications (proper dose, duration, importance of adherence) is important as integrated approach remains the cornerstone of management of any infectious disease. Combination therapy with two systemic agents should be reserved for chronic/recalcitrant dermatophytosis. Barrier impairment is essential for the establishment and perpetuation of infection. Hence dermatoses with barrier defect such as atopic dermatitis (AD) or psoriasis predispose to recalcitrant and rapidly spreading infections and the success of treatment outcome will depend on barrier repair and control of pruritus besides adequate antifungal treatment [14,15].

Limitation of the present study was drug susceptibility of dermatophytes to various antifungal drugs was not tested.

Conclusion

Thus change of causative organism (trichophyton mentagrophytes), steroid /triple combination creams misuse, change in the clothing pattern, inadequate dosing and duration of antifungal therapy, inadequate treatment of affected family members contribute to the recalcitrant tinea infections. Further drug sensitivity could not be done due to lack of resources. Modification of host factors such as weight reduction, hygiene, wearing loose cotton clothes, washing clothes with hot water, proper drying and ironing of clothes, avoidance of sharing items/ clothes/towels/ footwear helps to prevent transmission of infection. Counselling the patient regarding all these measures and medications (proper dose, duration, importance of adherence) is important as integrated approach remains the cornerstone to prevent the resurgence of dermatophytosis.

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Statement of Human and Animal Rights: All the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the 2008 revision of the Declaration of Helsinki of 1975.

Statement of Informed Consent: Informed consent for participation in this study was obtained from all patients.

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