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Original article

TRICHOPHYTON INTERDIGITALE CAUSING SEVERE TINEA CORPORIS AND TINEA CRURIS ET CORPORIS.

Dr. (Prof.) Seeba Hussain*

Department of Dermatology Venerology and Leprology, Katihar Medical College, Bihar, India

Abstract

Background :

Since many years, India has been plagued by an epidemic-like scenario of chronic, extensive, and resistant dermatophytosis. Dermatophytosis, also known as tinea, was once regarded as a minor infection that was simple to treat. Without oral antifungal agents, the use of such topical preparations to treat dermatophytosis can result in extensive lesions and fungal resistance. This study aimed to determine the aetiology and dermatophyte species associated with tinea corporis and tinea cruris et corporis with extensive lesions.

Methods :

The Department of Dermatology at the tertiary care centre conducted a study for two years. The consent of 158 patients was obtained. All patients with clinical findings of tinea corporis and tinea cruris et corporis who tested positive for KOH and/or culture were enrolled in the study. A thorough history was obtained.

Findings:

Results indicated that 149 (94.30%) were KOH positive and 158 (100%) were culture positive. Only Trichophyton interdigitale was isolated from 158 patients. None of the patients tested positive for HIV, and six patients (4%) had diabetes. Seventy percent of the patients reported using antifungal, antibiotic, and topical steroid creams in various combinations, and nearly ten percent used corticosteroid creams alone. Rest was unaware of the name of the moisturiser they used.

Conclusion :

Local immunity is lowered by topical steroids, which contribute to the development of extensive and atypical lesions. Dermatomycosis has reached epidemic proportions in this Katihar region. This region is rife with the misuse of unregulated steroid mixtures.

Keywords: Trichophyton interdigitale (T. interdigitale, sabouraud's dextrose agar, fixed drug combinations, over the counter, Submitted: 2023-06-23 Accepted: 2023-06-26

1. Introduction:

Dermatophytes are the most prevalent cause of superficial fungal infections on a global scale and are prevalent in developing nations, particularly tropical and subtropical nations such as India, where environmental temperature and relative humidity are high. Other factors, such as increased urbanisation and the use of occlusive footwear and restrictive clothing, have been linked to an increase in prevalence [1]. In recent years, studies on the epidemiology of dermatophytic infection in various regions of India have revealed an upward trend in the prevalence of cutaneous

* Corresponding author.
Email address: themedicmind15@gmail.com (Dr. (Prof.) Seeba Hussain)

dermatophytosis, along with a shift in the infection's spectrum and the isolation of some uncommon species [1, 2, 3]. In relatively extensive studies from Chennai and Rajasthan, Trichophyton rubrum remains the most prevalent isolate, with tinea corporis and tinea cruris being the most prevalent clinical manifestations. In Lucknow and New Delhi investigations, however, Trichophyton mentagrophytes [3] and Microsporum audouinii [4] were the most common isolates. Few studies have demonstrated the isolation of uncommon species such as Microsporum gypseum in nonendemic regions of the globe [5].

Dermatophytosis, also known as tinea, is caused by Trichophyton, Epidermophyton, and Microsporum, three genera of dermatophytes. Tinea corporis is the most prevalent clinical manifestation, followed by tinea cruris [1]. Trichophyton rubrum (T. rubrum) and Trichophyton interdigitale (T. interdigitale) cause the majority of infections. Clinical classifications include tinea capitis (head), tinea faciei (face), tinea barbae (beard), tinea corporis (body), tinea manus (hand), tinea cruris (groyne), tinea pedis (foot), and tinea unguium (nail). Other clinical variants include tinea pseudoimbricata, Majocchi granuloma, and tinea imbricata.

Very few cases of tinea corporis caused by Trichophyton violaceum have been reported [2-4]. Rao et al. [5] reported one case of tinea corporis attributable to T. tonsurans. Recently, the United Kingdom [6], Japan [7, 8], Germany [9], Switzerland [10], and Belgium [11] have reported cases of tinea corporis caused by Trichophyton benhamiae.

Tinea cruris is typically caused by T. rubrum and T. interdigitale; however, Kumar et al. [12] reported four cases of pubogenital dermatophytosis caused by T. violaceum [12]. Classic tinea corporis appears as an annular erythematous plaque with slightly elevated scaly borders and a central clearance. Tinea corporis and tinea cruris have vastly distinct clinical manifestations today. Rarely do we encounter cases of tinea corporis or tinea cruris with a classic appearance. Typically, patients present with multiple extensive lesions, and occasionally with a peculiar appearance, which can pose diagnostic difficulties. This epidemic-like situation is caused by the inappropriate combination of topical corticosteroid with antifungal and antibacterial creams, also known as fixed drug combinations (FDCs), which are readily available over the counter (OTC) and do not require a dermatologist's or doctor's prescription. This study aimed to determine the role played by Trichophyton interdigitale in causing tinea corporis and tinea cruris et corporis with extensive lesions.

2. Methods:

This retrospective study was conducted in the Department of Dermatology of Katihar Medical College, Katihar, Bihar, India at a tertiary care centre for two years from November 2020 to November 2022. The consent of 158 patients was obtained. A thorough history was obtained, including age, gender, site, duration, treatment received, and likely source of exposure. Patients were instructed to come to the mycology laboratory for sample collection after taking a bath with unscented detergent and water and without applying lotion or ointment, and they were sent there for sample collection. The site was scrubbed with 70% alcohol before collecting samples. With the aid of a sterilised scalpel blade, scales were collected from the periphery and placed in a sterile petri dish. The pustular lesions that were infected were sampled with a swab probe.

All samples were examined for fungal elements in a 20% potassium hydroxide (KOH) mount at high magnification. On Sabouraud's Dextrose Agar supplemented with chloramphenicol and cycloheximide, both the positive and negative samples were inoculated. The culture dishes were incubated at 25°C for four weeks and growth was monitored each week. To examine the microscopic structures in depth, lactophenol cotton blue (LPCB) preparations were created. To distinguish T. interdigitale from T. rubrum, additional assays, such as urease and in vitro hair perforation tests, were conducted. Clinically typical or clinically suspicious (atypical structures) cases of tinea corporis and tinea cruris et corporis of all

ages and both sexes that were KOH positive and culture positive were included in the study.

3. Results:

On the obverse, colonies of T. interdigitale were white and cottony, while on the reverse, they were beige to brown. We isolated T. interdigitale from all of our patients. On KOH examination, septate, branching hyphae were observed. Lacto Phenol Cotton Blue mounts revealed septate fungal hyphae, numerous spherical microconidia arranged in clusters resembling clusters of grapes, cigar-shaped macroconidia, and spiral hyphae. There were 158 patients enrolled in the study. There were 98 (62%) male patients and 60 (38%) female patients. 149 (94.30%) were KOH positive, while all 158 (100%) were culture positive (Table 1).

The percentage of males and females with tinea corporis and tinea cruris was highest among those aged 16 to 30. In this study, 52.63 percent of females suffered from tinea corporis, compared to 48.38 percent of males. However, the percentage of males with tinea cruris et corporis was higher than that of females (Table 1). No cases of tinea cruris et corporis were observed in males and females aged 60 and older, nor in females aged 0 to 15 years. None of the patients had inflammatory lesions or lymph node involvement. The lesions were pervasive and atypical in appearance.

4. Discussion:

The modified variants of tinea corporis are a result of the application of topical corticosteroids in addition to antibiotics and antifungal agents. The lesions become extensive without central clearance and occasionally acquire a peculiar appearance, posing diagnostic difficulties and mimicking a number of dermatological conditions, including psoriasis, granuloma annulare, pityriasis rosea, and Hansen's disease. According to a number of investigations conducted in India, tinea corporis and tinea cruris are the most prevalent clinical presentations, and T. rubrum was consistently identified as the most prevalent isolate [13]. According to two small investigations, tinea unguium is the most prevalent presentation [14, 15].

Those prone to dermatophytic infections include:

- those with weakened immune systems, such as infants, the elderly, and those with AIDS, HIV infection, cancer, or diabetes
- those with a genetic predisposition to infection; and iii. those with a compromised immune system
- People who perspire profusely, as moist clothing and footwear can promote fungus growth on the epidermis
- Those who come into contact with a person with a dermatophytic infection
- People who frequent moist communal spaces, such as locker rooms and showers, because fungi require moisture to develop and reproduce.

Obese individuals exhibit excessive skin creases. The climate in Katihar is sweltering and humid. Additionally, the current fashion trend of donning synthetic, form-fitting clothing contributes to tinea cruris and tinea corporis. With the application of topical corticosteroid, the lesions become extensive and may spread from the groyne to the abdomen, resulting in tinea cruris et corporis, or tinea corporis may progress downward to involve the groyne, genitalia, thighs, and buttocks. Tinea corporis that extends to the groyne is known as tinea corporis et cruris. We have used tinea corporis et cruris and tinea cruris et corporis interchangeably. Merging of lesions is common due to the widespread dissemination caused by FDCs. Tinea corporis was observed to be the most prevalent clinical form (61.20%), followed by tinea cruris (24.34%) [1]. All of our cases, however, were caused by T. interdigitale. We did not experience any cases of T. violaceum or T. rubrum. According to a recent study conducted by our team, 98% of cases were caused by T. interdigitale, 1% by T. rubrum, and 1% by T. violaceum. 1 Similar to studies by Verma et al.

Table 1: **Age and sex distribution**

Age	Male		Female	
	Tinea corporis	Tinea cruris et corporis	Tinea corporis	Tinea cruris et corporis
0-15	4	2	4	-
16-30	30	22	20	10
31-45	20	08	08	06
46-60	06	04	04	06
>60	02	-	02	-
Total	62	36	38	22

[16, 17], the clinical forms of tinea, i.e. tinea faciei and tinea genitalis, were reported more frequently in our previous research. Also covered was female tinea genitalis [18–20]. In 2016, we reported the first incidence of tinea cruris and tinea genitalis caused by T. interdigitale [19]. Since the mycology section of microbiology was personally involved in the sample collection, the positivity of KOH mount and culture was very high compared to the majority of studies in India, as well as the extensive lesions and the rapid growth of T. interdigitale.

There is a shortage of qualified dermatologists in the country, particularly in rural areas. However, even trained physicians and dermatologists have been observed prescribing the incorrect TC concentration or for the wrong indication [20]. Occasionally, dermatologists, physicians, and unqualified practitioners prescribe FDCs without verifying the diagnosis. None of the patients had an inflammatory lesion or lymph node involvement. Patients with extensive and multiple lesions are highly infectious [21]. These patients require both topical and dietary antifungal treatment for a lengthier duration than is typical. When patients are clinically cured, mycological cure confirmation is essential. Additionally, all family members should be treated concurrently.

Unfortunately, the poor patients cannot afford this costly treatment, so they purchase inexpensive FDCs sold over the counter, which do not help the patients and only prolong their suffering. This can lead to a chronic, resistant form of dermatophytosis and may promote fungal resistance [22-25]. There are insufficient accredited laboratories in the country, and only a handful of laboratories conduct antifungal susceptibility testing. In addition, the dermatology department should be equipped to perform dermoscopy and determine whether vellus hair is involved, which is an indication for administering systemic antifungal treatment.

5. Conclusion:

This epidemic-like scenario caused by T. interdigitale requires the immediate attention of dermatologists, microbiologists, the government, the department of public health, drug regulatory authorities, and most importantly, the general population. The sale of FDCs as OTC should be prohibited. The government must provide free medical care for the impoverished. Electronic media and newspapers should be utilised to increase public awareness.

6. Limitation:

Molecular characterization was not done to see genetic relatedness.

7. Acknowledgement:

None

8. List of abbreviations:

KOH- Potassium Hydroxide
FDC- Fixed drug combinations

OTC- Over the counter
LPCB- Lactophenol cotton blue

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10. Conflict of Interest:

None.

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Author biography

Dr. (Prof.) Seeba Hussain Associate Professor, Department of Dermatology Venerology and Leprology, Katihar Medical College, Bihar, India.