EDITORIAL

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Resistant Dermatophytosis: A Stubborn Habit and Major Challenge in Iraq

Thamir A Kubaisi*
Department of Internal Medicine/Dermatology, College of Medicine, University of Anbar, Ramadi City, Anbar, Iraq
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Dermatophytosis is a common infective cutaneous dermatosis seen in dermatology outpatient clinics. It developed in response to a superficial mycological infection involving the skin, hair, and nails. Superficial fungal infection affects 20–25% of all over the world. The disease is caused by dermatophytes, also termed ringworms or tinea [1]. Resistant dermatophytosis is characterized by persistent infection or recurrence within four weeks after a suitable dose of oral azole and allylamine antifungal drugs. It is running a long-lasting course with episodes of exacerbations and remissions [2, 3]. Dermatophytosis is characterized by an erythematous, pruritic, flat, white, or brown plaque with a ring-like active border that produces abundant powdery scales when scraped (Figure 1). It is categorized according to the involved locations, for example, tinea corporis indicates infection of the trunk or limbs, tinea cruris (inguinal or perianal area); and tinea manuum refers to dermatophytosis of the hand [4].

The pathogens have an affinity for keratinized tissue and can invade the skin, hair, and nails, and they are allocated to 3 genera: *Epidermophyton*, *Trichophyton*, and *Microsporum* [5]. Regarding the origin of human infection, they are divided into anthropophilic, zoophilic, and geophilic species. All types can infect human beings, and when zoophilic fungi transmit to humans, then humans can contaminate another human. However, the severity of the clinical manifestations is determined by the species or strains of contaminating fungus [6].

The treatments for dermatophytosis are topical agents like Whitfield ointment, Castellani solution, 5% tincture of iodine, clotrimazole, ketoconazole, and terbinafine. While the most common oral antifungal drugs are itraconazole, fluconazole, griseofulvin, and terbinafine [3, 4, 7]. During the last few years, there has been a growing tendency to relapse with tinea following the termination of antifungal treatment. Consequently, many comparative studies advised using combination therapy in the management of this stubborn skin infection for 2–3 months, like itraconazole plus 5% tincture of iodine, itraconazole and terbinafine [3, 4, 7].

Voriconazole is a new and expensive oral antifungal drug

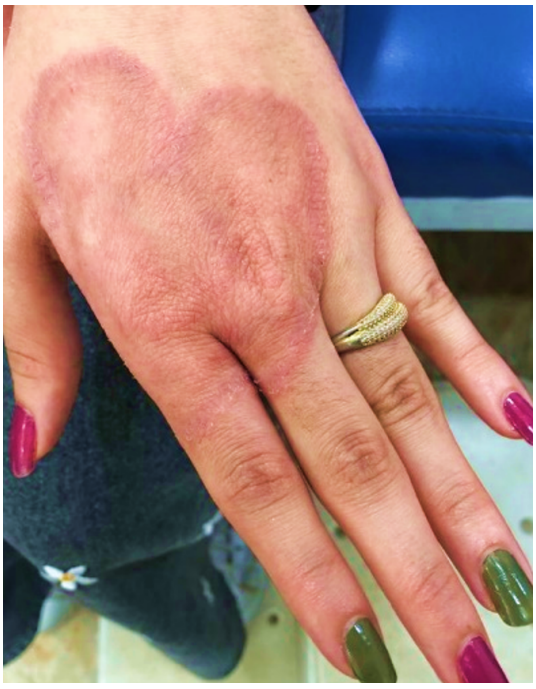

Figure 1. A 25-year-old female presented with resistant tinea manuum, showing an active border arranged like a love-heart. It gave a message: "I love humans".

* Corresponding author:E-mail:med.thamer.alkubaisi@uoanbar.edu.iq

that has promise as a nascent alternative for the treatment of resistant tinea. This drug shows a safety profile, good efficacy, and a low rate of recurrence. The loading dose is 800 mg on the first day, followed by 200 mg twice a day (400 mg/day) given to complete the 2-weeks course [8].

A resistant type of superficial fungal skin infection has appeared in India. In 2017, Dogra et al. described atypical tinea in the Indian population. They complained of an unusual disease presentation, living in poor hygienic conditions, and having a history of animal contact. Furthermore, all patients were immunocompetent and not using any medications, such as topical and systemic corticosteroids. *Trichophyton mentagrophytes* were isolated in 35% of the cases and considered the most common type followed by *Trichophyton interdigitale* strains (32%), and *Trichophyton rubrum* which was established in 27.5% of the patients [9, 10]. A recent report noticed the increased virulence of *Trichophyton Indotineae*, a zoophilic outline, which is aggravated by deprived hygienic circumstances [11].

The frequency of chronic dermatophytosis in various provinces of Pakistan has increased and runs a long course with events of aggravations, remissions, and drug resistance [2]. An Iranian family showed generalized dermatophytosis with multidrug-resistant *Trichophyton mentagrophytes* genotype VIII [12]. A new report in China showed mixed strains of fungi causing chronic tenia capitis [13]. Within the last year, it was described that two patients were infected with terbinafine-resistant *Trichophyton Indotineae* in Turkey [14]. A pilot study approved that antifungal resistance and dermatophyte recurrence exist in Europe, even though, these are still uncommon and frequently related to trips to endemic areas [15].

Over the past few years, Iraqi dermatologists have encountered a new dilemma of chronic and recalcitrant dermatophytosis that they had never experienced previously. The rate of such cases has increased alarmingly, leading to significant social and emotional distress. The disease attacks both genders, all ages, and several members of the family. It is hard to agree whether these relapses indicate resistance to medications, new pathogens, or other interpretations. The superficial fungal infections start to have challenging clinical appearances and surprisingly imitate several skin illnesses; generally, dermatitis, psoriasis, photosensitivity, and even keratoderma. Thus, a direct KOH microscopical examination or fungal culture is specified to confirm the diagnosis. In specimens from 63 patients, the most common isolated dermatophyte classes were *Trichophyton mentagrophytes/ Trichophyton interdigitale* complex (63%), followed by *Microsporum canis* (11%), *Epidermophyton floccosum* (10%), and *T. rubrum* (8%) [3, 6].

The following nine issues, entirely, can provide strong possible explanations for the epidemic of resistant dermatophytosis in Iraq:

1. Poor treatment adherence because of the long (2–3 months) course of expensive drugs [3, 8].
2. Standard antifungal agent resistance; during remission, frequently patients did not complete the well-organized course. They considered the drug as a symptomatic relief medication [7].
3. Sustained transmission among affected members of the family due to sharing of beds, swimming towels, or clothes [3].
4. Possible variation in the skin barrier function and deprived hygiene [10].
5. Topical steroid abuse by a patient or doctor. Dermatophytosis is considered an imitator for several common skin problems [6].
6. The surge of fungal virulence strains, such as *Trichophyton mentagrophytes* genotype VIII, *Trichophyton interdigitale*, and *Trichophyton Indotineae*, or probably mixed infections of different organisms [11, 12, 14].
7. Recently, it has been noticed that many families have raised pets inside their houses, particularly Shirazi cats. This could be a source of resistant tinea.
8. Possibility of azole antifungal interactions with many antipsychotic and antidepressant agents. As well as the bad manufacturing of drugs by undependable companies.
9. Although the disease infects immune-competent individuals [9, 10], clinicians should look for and manage immune-compromised states, such as malnutrition, diabetes mellitus, and acquired immunodeficiency syndrome.

In conclusion, it is critical for the dermatologist to look beyond the likelihood of resistant tinea and to keep that possibility at the top of the differential diagnoses list until proven otherwise. Particularly when facing cases with scaly erythematous plaques that do not respond to topical steroids; especially those with a history of recent travel to India or nearby regions. The exact mechanisms behind the emergence of stubborn dermatophytosis are still obscure. There is a strong need for alternative treatment options. Further studies in corporations with other correlated pharmacological specialties are desirable, including randomized controlled trials regarding the type and dose of oral antifungal agents, as well as the course of treatment.

ETHICAL DECLARATIONS

Ethics Approval and Consent to Participate

Is not required for an editorial article. Informed consent had been obtained from the patient in Figure 1. The author certifies that the patient gave her consent for the image publication and that no personal data is to be included in the journal.

Consent for Publication

Not applicable (no individual personal data included).

Availability of data and material

None.

Competing interests

The author declares that there is no conflict of interest.

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Authors' Contributions

Kubaisi TA was responsible for the literature review and writing the manuscript. The author read and approved the final version of the manuscript.

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