

Tinea genitalis profunda, a diagnostic challenge: a case report and literature review

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Abstract

Tinea genitalis is a relatively new entity of dermatophyte infection, observed mainly in young adults. By definition, it is localized on the mons pubis and on the labia in women, and on the penile shaft in men. It has been described as a “lifestyle disease” and potentially sexually transmitted disease. We report the case of a 35-year-old patient, an immigrant woman, with tinea genitalis profunda, presenting with painful deep infiltrative papules and plaques, purulent inflammation, and signs of secondary impetiginization. Concomitantly, tinea corporis, tinea faciei, tinea colli, and tinea capitis were diagnosed. Her skin lesions developed over an approximately 2-month period. The zoophilic dermatophyte *Trichophyton mentagrophytes* was cultivated from the pubogenital lesions, as well as *Escherichia coli* and *Klebsiella pneumoniae*. The patient was treated systemically with terbinafine, antibiotics, and short-term corticosteroid, and topically with antimycotic and antibiotic cream. During almost 3 weeks of hospitalization, satisfactory improvement was achieved. A literature review with new clinical and epidemiological observations is presented for this rare type of tinea, which poses a diagnostic and treatment challenge.

Keywords: tinea genitalis, dermatophytosis, *Trichophyton mentagrophytes*, zoophilic dermatophyte, immigration

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Introduction

In the last decade, an increase in dermatophytosis and changing epidemiology has been observed in humans due to several reasons: migration of populations, socioeconomic conditions, international travel, climate and environmental changes, lifestyle, overcrowded living conditions, changes in human interaction with animals, and aging of the population with various comorbidities (1, 2). Fungal skin infections present a significant public health concern worldwide. According to a recent survey on the prevalence of the most common skin diseases in Europe, fungal skin diseases were the most common skin conditions in the population aged 18 and older (3).

Tinea genitalis (syn. genital tinea, pubogenital tinea, genital dermatophytosis) is a relatively new entity of dermatophyte infection, observed mainly in young adults. By definition, it is localized on the mons pubis and labia in women, and on the penile shaft in men, with the possibility of expansion into the groin and scrotum (4). It can occur with or without concomitant tinea inguinalis or tinea corporis. According to recent epidemiological observations, it has been described as a “lifestyle disease” (4) and potentially sexually transmitted infection (5).

We present a 35-year-old patient, an immigrant woman, with severe tinea genitalis, and we review previous reports on this rare type of tinea with new clinical and epidemiological observations, and diagnostic and treatment recommendations.

Case report

A 35-year-old female patient was referred to our department from the general emergency medical service due to an extensive inflammatory erythematous plaque in the pubic and genital area and erythematous annular macules on the trunk and face. She

reported experiencing genital lesions for approximately 2 months. She arrived in Slovenia with her family from Afghanistan 10 days before referral to our department.

Prior to admission, she visited the emergency medical service twice, where she received systemic antibiotics, topical antibiotics, and antimycotic treatment. According to anamnestic data, her husband had several annular macules on his trunk.

Due to extensive painful inflammatory plaques in the pubic and genital area that impaired her gait, the patient was admitted to our department. At admission, she was subfebrile (37.7 °C) and had swollen and painful inguinal lymph nodes. An extensive livid erythematous plaque with numerous papules and pustules and purulent discharge was present in the pubic area as well as the labia majora (Fig. 1).



Figure 1 | Extensive erythematous plaque with numerous papules and pustules and purulent discharge on the mons pubis (tinea genitalis profunda) and annular erythematous macules on the thighs and abdomen (tinea corporis).

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Evidence of hair shaving on the pubic region was present. Numerous annular erythematous macules with scaly margins were present on the trunk (Fig. 2), both thighs, the neck, the face, and the scalp. A total of 14 extragenital lesions were observed.



Figure 2 | Erythematous scaly macules on the trunk (tinea corporis).

Laboratory tests showed elevated CRP (87 mg/l, reference range up to 5 mg/l) and leukocytosis ($14.6 \times 10^9/l$, reference range $4-10 \times 10^9/l$), elevated alkaline phosphatase (1.83 $\mu\text{kat/l}$, normal $< 1.74 \mu\text{kat/l}$), AST (1.29 $\mu\text{kat/l}$, reference range up to 0.52 $\mu\text{kat/l}$), ALT (1.39 $\mu\text{kat/l}$, reference range up to 0.77 $\mu\text{kat/l}$), and gamma-GT (2.11 $\mu\text{kat/l}$, reference range up to 0.92 $\mu\text{kat/l}$). Concurrent infection with COVID-19, hepatitis, and tuberculosis was excluded.

Direct microscopic examination revealed hyphae, and the zoophilic dermatophyte *Trichophyton mentagrophytes* grew in a culture of skin scrapings from several lesions, including the pubogenital region. PCR was performed from the culture and confirmed *Trichophyton* sp. Due to evident secondary bacterial infection in the pubic area, we performed a pustule swab in which ESBL-producing *Escherichia coli* and *Klebsiella pneumoniae* were isolated.

We introduced terbinafine orally at a 250 mg daily dose. Due to severe inflammation, simultaneous application of peroral methylprednisolone was initiated for a period of 2 weeks at an initial 16 mg daily dose. Concurrent systemic antibiotic therapy with amoxicillin / clavulanic acid was administered first and was later changed to piperacillin / tazobactam intravenously, according to the antibiogram. Due to severe pain, the patient also needed analgesics. Topically, terbinafine cream was applied to all lesions, and additionally antibiotic gentamicin cream to pubogenital lesions.

Significant improvement of all skin lesions was observed during hospitalization (Figs. 3, 4), with a decrease in pain and laboratory inflammatory parameters. The patient was able to walk normally and was discharged from the department after 19 days. Unfortunately, she was lost to follow-up.

Discussion

Tinea genitalis profunda was diagnosed in our patient, along with tinea capitis, tinea faciei, tinea colli, and tinea corporis. The causative pathogen was the zoophilic dermatophyte *T. mentagrophytes*, as in many other reports on tinea genitalis published in recent years.

Dermatophytosis of the pubogenital region can be caused by anthropophilic, zoophilic, and geophilic dermatophytes. In the past, anthropophilic dermatophytes were the most common caus-



Figure 3 | Improvement of tinea genitalis after treatment.



Figure 4 | Improvement of tinea corporis after treatment.

ative pathogens and were mainly reported in males (6–10). The source of infection was attributed to autoinoculation from tinea pedis and toenail onychomycosis (11).

In the last decade, tinea genitalis caused by zoophilic dermatophytes has increasingly been reported with the dimensions of epidemic outbreaks (12). The most common causative dermatophyte has been *T. mentagrophytes* (12–19), followed by *Microsporum canis* (4, 20). Other zoophilic dermatophytes—*T. benhamiae* (earlier known as *Arthroderma benhamiae*) (4, 12, 21), *T. verrucosum* (22), and *T. erinacei* (23)—have rarely been diagnosed. The zoophilic type of tinea genitalis has also often been observed in females. Table 1 presents an overview of previous reports on tinea genitalis with causative pathogens, sex distribution, and possible sources of infection.

Due to changes in the taxonomy and nomenclature of the *T. mentagrophytes* complex in 2017 (24), the causative dermatophytes of tinea genitalis reported in the literature should be interpreted with caution. *T. interdigitale* was the term used for a zoophilic strain before 2017, which is now named *T. mentagrophytes*.

With implementation of genotyping as the most reliable method for differentiation between zoophilic and anthropophilic strains within the *T. mentagrophytes* complex, some zoophilic dermatophytes have been found to have a high possibility of human-to-human transmission, such as genotypes VII and VIII (11).

T. mentagrophytes genotype VII was recently recognized as a causative pathogen of highly inflammatory, painful, and persis-

tent infections, mostly of the pubogenital region. Sexual transmission of infection was assumed in the majority of patients after having had contact with a sex worker in Thailand (12). Interestingly, the same genotype of *T. mentagrophytes* was also diagnosed in a patient with tinea barbae after a journey to Thailand (25). *T. mentagrophytes* genotype Thailand Type 1 has recently been recognized as a cause of severe inflammatory and abscessing dermatophytosis in patients with tinea genitalis and tinea barbae (26). In contrast, *T. mentagrophytes* genotype VIII has been diagnosed in rural areas in India so far and was found to be associated with mild-to-moderate inflammation in the genital area (27). Unfortunately, genotyping was not performed in our patient.

In the last decade, more attention has also been paid to geophilic dermatophytes. Genital infection due to *Nannizzia gypsea* (earlier known as *Microsporum gypseum*) was seen only in males and was confined to the scrotum. It has mainly been reported from China (28). The manner of transmission remained unexplained; however, sweating and gyms were suspected. There was no history of sexual transmission. It was also reported on the scrotum in a young immunosuppressed male patient (29). Scrotal tinea caused by *N. incurvata* was recently reported in two young otherwise healthy men with no history of soil or pet contact (30). Geophilic dermatophytes were only observed in a male on the scrotal skin, with a unique presentation, such as pseudomembranous-like dermatitis, whitish crusts, and grayish-yellow scales (11, 28).

Clinically, a variety of lesions can occur in tinea genitalis, from superficial erythematous macules, follicular papules and pustules, and painful nodules to deeper inflammatory plaques with ulcerations, seropurulent discharge, and fistulas, resulting in scarring alopecia (18). Topical application of corticosteroids can obscure the clinical picture and thus complicate the diagnosis, allowing lesions to spread more rapidly with the image of tinea incognito (11, 31). Epidemic outbreaks of tinea genitalis have been observed in India due to improper use of topical corticosteroids (31). Double-edged tinea can occur on the pubic region after application of topical corticosteroids (32).

A special entity of deep tinea is Majocchi granuloma, defined

as a deep folliculitis caused by a dermatophyte, with the most common causative agent originally being *T. rubrum*. In tinea genitalis, it is most commonly present in young women in areas where they shave their hair (13). Tinea genitalis can also present with the kerion celsi type of inflammation (14, 15, 18). Regional lymphadenopathy, leukocytosis, and fever may be present, as was also observed in our patient.

Tinea genitalis is often diagnosed with a significant delay, leading to improper treatment, more severe and deep inflammatory lesions, secondary bacterial infections, increased morbidity, and permanent alopecia. Patients with limited healthcare access, as was the case in our immigrant patient, are especially vulnerable to diagnostic delay and a more severe course of the disease. Awareness about this rare type of tinea is low and is often misinterpreted as bacterial folliculitis or furunculosis. Differential diagnosis also includes contact dermatitis, inverse psoriasis (13), candidiasis, and hidradenitis suppurativa. Rarely, mycobacterial infection and actinomycosis can be considered (18).

Many predisposing factors should be considered in tinea genitalis: owning pets (which are a source of zoophilic dermatophytes), shaving the genital area, traveling to tropical countries, and heterosexual sexual intercourse (4). Dermatophytosis is more common in tropical countries due to warm and humid climates (5, 11). Shaving or waxing pubic hair is an important promoting factor, which allows deep invasion of the pathogen due to its continuous spread along the hair structures (5, 12, 14). It also promotes sexual transmission and autoinoculation from extragenital tinea (12), which was probably the transmission pathway in our patient. Additional risk factors include diabetes, immune deficiency, HIV infection, and atopic dermatitis (5, 7).

New pathways of dermatophyte transmission have been observed in tinea genitalis. *T. mentagrophytes*, although a zoophilic dermatophyte, has developed a greater ability for human-to-human transmission (18). It has been speculated that the newly recognized zoophilic strain, the so-called "Thai variant," has a higher virulence. Based on this, tinea genitalis has been proposed as a potentially sexually transmitted infection since 2015 (5, 12). Indi-

Table 1 | Tinea genitalis due to various dermatophytes and possible sources of infection.

Ref.	Patients	Dermatophytes	Possible infection sources
4	11 M, 19 F	<i>M. canis</i> , <i>T. interdigitale</i> *, <i>A. benhamiae</i> , <i>T. verrucosum</i> , <i>T. rubrum</i> , <i>T. tonsurans</i>	Various: contact with cats, mice, rats; travel to Egypt, Mongolia
5	5 M, 2 F	<i>T. interdigitale</i> *	Sexual transmission in Southeast Asia
12	26 M, 17 F	<i>T. mentagrophytes</i> genotype VII 86% <i>T. benhamiae</i> 4.7% Negative culture 9.3%	Various: sexual transmission, contact with animals, gyms?
13	1 F	<i>T. mentagrophytes</i>	Unknown
14	1 F	<i>T. mentagrophytes</i>	Tinea manuum?
15	1 F	<i>T. mentagrophytes</i>	Unknown
16	1 F	<i>T. mentagrophytes</i>	Dog
17	1 F	<i>T. mentagrophytes</i>	Contact with various animals
18	1 F	<i>T. mentagrophytes</i>	Hotel wellness facilities?
19	1 F	<i>T. interdigitale</i> *	Sexual transmission
20	17 M	<i>M. canis</i> 58.8% <i>E. floccosum</i> 29.4% <i>T. interdigitale</i> * 11.8%	Various: contact with animals, autoinoculation
21	1 M, 1 F	<i>T. benhamiae</i>	Sexual transmission (M), guinea pig (F)
22	1 F	<i>T. verrucosum</i>	Cat
23	1 F	<i>T. erinacei</i>	Unknown, spa facilities?
27	174 M, 102 F	<i>T. mentagrophytes</i> genotype VIII 99.3% <i>T. rubrum</i> 0.7%	Various: autoinoculation, sexual transmission, sharing clothes
28	28 M	<i>N. gypsea</i> 48.6% <i>T. rubrum</i> 25.7% <i>E. floccosum</i> 5.7%	Unknown, gyms?

M = male, F = female, *M* = *Microsporum*, *T* = *Trichophyton*, *A* = *Arthroderma*, *E* = *Epidermophyton*, *N* = *Nannizzia*.

**T. interdigitale* was defined as a zoophilic dermatophyte according to nomenclature before 2017.

rect human–object–human transmission was also proposed, such as at gyms and in wellness and fitness facilities at hotels, through sharing clothes, towels, and razors (12).

Diagnosis must be confirmed by mycological examination, including microscopy, cultivation, and PCR analysis (6). The exact method of differentiation between dermatophytes depends more on the genotype rather than phenotypic characteristics (11). In recent years, molecular techniques such as RT-PCR, multiplex PCR, PCR-ELISA, nested PCR, and PCR-RFLP have significantly evolved. In cases of clinical suspicion and negative mycological examination, PCR and histopathological examination with PAS stain of the skin is needed (1).

Regarding treatment, systemic antifungal therapy is required for tinea genitalis, with terbinafine being the drug of choice. Terbinafine 250 mg daily for at least 1 month is recommended but should be extended to 6 weeks or even longer in more severe and recalcitrant cases (11). On average, 7 weeks of systemic treatment was needed in tinea genitalis caused by *T. mentagrophytes* (12). In cases with a poor treatment response, either itraconazole or fluconazole can be considered (25). Alternatively, griseofulvin 250 to 500 mg twice daily for 4 to 6 weeks is recommended if resistance to terbinafine is suspected (11).

Topical azoles are preferred over allylamines because of their broad-spectrum antifungal activity (11, 12). Topical corticosteroids should be discontinued immediately and can only be considered

in severe inflammatory dermatophytosis in the 1st week of treatment (18, 33).

In cases of extensive and painful inflammatory plaques, in our experience, short-term and low-dose systemic corticosteroid therapy seems justified in combination with systemic antifungal therapy. In some reported cases with severe inflammation, systemic prednisone was administered for 6 to 21 days (5).

Conclusions

Tinea genitalis has been observed with increasing frequency in recent years, as well as changing epidemiology, diversity of possible sources of infection, and new patterns of transmission. This type of tinea should be included in the differential diagnosis of superficial and deep inflammatory lesions in the genital and pubic area. Early diagnosis is essential to prevent the development of extensive painful inflammatory plaques that require long-term systemic antifungal treatment, the occurrence of secondary bacterial infection, and persistent alopecia.

The goal of this case report is to raise awareness about this type of tinea and the new observation that patients with limited healthcare access, including migrating populations, are especially vulnerable to diagnostic delay and increased morbidity from this infection.

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