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Yefta Yefta
Departement of Dermatology and Venereology; Faculty of Medicine, Public Health and Nursing; Gadjah Mada University / Dr. Sardjito Hospital; Yogyakarta, Indonesia

Dwi Retno Adi Winarni
Departement of Dermatology and Venereology; Faculty of Medicine, Public Health and Nursing; Gadjah Mada University / Dr. Sardjito Hospital; Yogyakarta, Indonesia

Agnes Sri Siswati
Departement of Dermatology and Venereology; Faculty of Medicine, Public Health and Nursing; Gadjah Mada University / Dr. Sardjito Hospital; Yogyakarta, Indonesia

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Case Series

Therapy selection for tinea corporis and cruris with commorbidity: 3 case series

Yefta[1], Dwi Retno Adi Winarni[1], Agnes Sri Siswati[1]

[1]Departement of Dermatology and Venereology; Faculty of Medicine, Public Health and Nursing; Gadjah Mada University / Dr. Sardjito Hospital; Yogyakarta, Indonesia

Email: yefta.yft@gmail.com

ABSTRACT

Background: Dermatophytosis is a superficial (skin, hair and nails) fungal infection caused by dermatophyte group fungi (*Trichophyton, Epidermophyton* and *Microsporum*). Immunocompromised conditions cause fungal infections to become more widespread and require consideration of therapy.
Case Illustration: This case series represented three cases of tinea corporis and tinea cruris in patients with comorbidities. The first case was tinea corporis and tinea cruris in a patient with congestive heart failure with oral terbinafine therapy. The second case was tinea corporis and tinea cruris in a patient with bilateral fourth degree hydronephrosis with oral griseofulvin therapy. The third case was tinea corporis in a patient with autoimmune hemolytic anemia with oral itraconazole therapy. A two-week post-systemic antifungal evaluation gave good results in all of the patients.
Discussion: Selection of antifungals in dermatophytosis cases considering the patient's condition (contraindications and side effects that can be caused) provides a good outcome in patients with comorbidities.
Conclusion: Dermatophytosis (tinea corporis and tinea cruris) is common in immunocompromised patients. This is due to decreased immunity causing dermatophytes to develop easily on the skin. Selection of the right therapy, considering comorbid conditions is important in order to get the best results for the patients.

Keywords: *Dermatophytosis, tinea, comorbidities*

Background

Dermatophytosis is a superficial fungal infection disease (skin, hair and nails) caused by the dermatophyte group (*Trichophyton sp., Epidermophyton sp.* and *Microsporum sp.*).[1] Superficial fungal infection is a worldwide problem affecting more than 25% of the population. The clinical presentation of dermatophytosis depends not only on the causative fungus, but also on host factors. Individuals with compromised immune systems and comorbid diseases are more susceptible to dermatophyte infections.[2] The terminology of dermatophytosis itself is adjusted to the anatomical location of the infected body.[3] Based on research in several teaching hospitals in Indonesia, the incidence of superficial dermatophytosis ranges from 4.1% -26.4% among all skin disorders.[4] Based on the medical record data of Dr. Sardjito for the 2016-2020 period, there were 521 tinea corporis patients with a total of 719 visits and 601 tinea cruris patients with a total of 810 visits.

In immunocompromised individuals, superficial fungal infections are more common, such as in patients with HIV/AIDS, diabetes mellitus, pregnant women, cancer sufferers, autoimmune conditions and others.[5] The diagnosis of tinea corporis and cruris includes history, physical examination and laboratory tests.[6] Skin scraping with potassium hydroxide (KOH) is the standard microscopic examination to diagnose tinea and identify long hyphae and/or arthrospores. Culture examination with Sabouraud Dextrose Agar (SDA) media is the gold standard for diagnosis to identify the causative fungal species.[7]

Tinea corporis and tinea cruris can be treated using antifungal agents either topically or systemically depending on the extent of the lesions. Choosing the right antifungal with respect

to the patient's condition is an important consideration to remember by every doctor who treats patients with these infections. Patient education is also the key to the success of this superficial dermatophytosis therapy.[3] For clinicians, the challenge of tinea case therapy is the selection of systemic antifungal agents that are appropriate for the patient's condition, especially those with comorbidities, for minimal side effects and no contraindications.

This paper will discuss three case series of tinea corporis and tinea cruris in patients with various comorbidities including diabetes mellitus (DM), congestive heart failure (CHF); hydronephrosis and autoimmune hemolytic anemia with emphasis on their management. The purpose of this case series is to review the diagnosis and selection of antifungal therapy according to the patient's condition.

Case Illustration

Case 1

A 65-year-old male with the chief complaint of itchy red rash on his stomach, arms, legs and groin which became covered with fine scales since 2 months. Past medical history included diabetes mellitus 2 years with novorapid treatment and congestive heart failure 1 year with clopidogrel, furosemide, miniaspi, and ramipril treatment. On physical examination, there was an erythematous rash with fine white scales, active edges, polycyclic and central clearing on the chest, nape, both arms, back, groin and lower extremities (Figure 1.1). The KOH examination showed septate hyphae (Figure 1.2). Cultures with sabaroud dextrose agar showed that the colonies were generally flat, white to cream in color, with a powdery to granular surface suitable for the growth of *Trichophyton mentagrophytes* (Figure 1.3). The patient was diagnosed with tinea corporis and cruris with comorbid conditions of DM and CHF. Patient was given terbinafine 250 mg/day (for 2 weeks) and 1% terbinafine cream 2 times/day. Patient showed improvement at the 2-weeks follow-up (Figure 1.4).

Figure 1.1. Clinical presentation (before treatment) of case 1

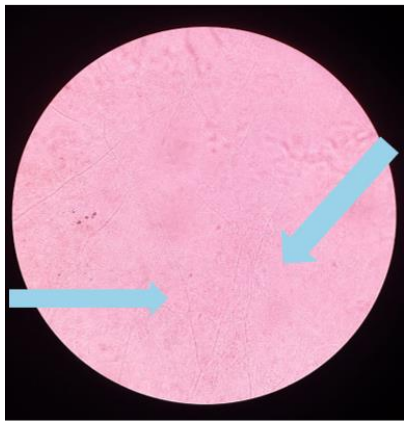

Figure 1.2. KOH examination showed septate hyphae (arrow) of case 1

Figure 1.3. *Trichophyton mentagrophytes* colony of case 1

Figure 1.4. Clinical presentation (2 weeks after treatment) of case 1

Case 2

A 31-year-old woman with the main complaint of an itchy red rash in the groin, buttocks and thighs since two months. Past medical history included grade 4 bilateral hydronephrosis since 3 months with elevated urea and creatinine levels. On physical examination, the rash was erythematous and hyperpigmented with fine white scales, active margins, polycyclic and central clearing on the groin, buttocks and both thighs (Figure 2.1). The KOH examination showed septate hyphae (Figure 2.2). Cultures with SDA showed that the colonies were generally flat, white to cream in color, with a powdery to granular surface suitable for the growth of *Trichophyton mentagrophytes* (Figure 2.3). The patient was diagnosed with tinea corporis et cruris in a patient with bilateral hydronephrosis. Patient was given griseofulvin 500 mg/day (4 weeks) and 1% terbinafine cream 2 times/day. The patient showed improvement at the 4-weeks follow-up (Figure 2.4).

Case 3

A 31-year-old woman with the main complaint of an itchy red rash under the right breast fold since 3 weeks. Past medical history included autoimmune hemolytic anemia (AIHA) with routine treatment of methylprednisolone and folic acid. On physical examination, there was erythematous rash with fine white scales, active margins, polycyclic and central clearing under the right breast fold (Figure 3.1). KOH examination showed septate hyphae (Figure 3.2). Cultures with sabaroud dextrose agar showed that the colonies were flat with a raised center and radial grooves, the color was pale-buff, suitable for the growth of *Trichophyton tonsurans* (Figure 3.3). Other laboratory examinations showed hemoglobin and hematocrit were decreased and direct Coomb's test was positive. The patient was diagnosed with tinea corporis in patients with AIHA. The patient was given itraconazole 100mg/day (2 weeks) and terbinafine cream 1% 2 times/day. The patient showed improvement at the 4-weeks follow-up examination (Figure 3.4).

Figure 2.1. Clinical presentation (before treatment) of case 2

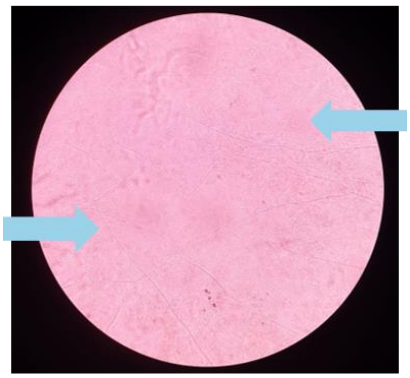

Figure 2.2. KOH examination showed septate hyphae (arrow) of case 2

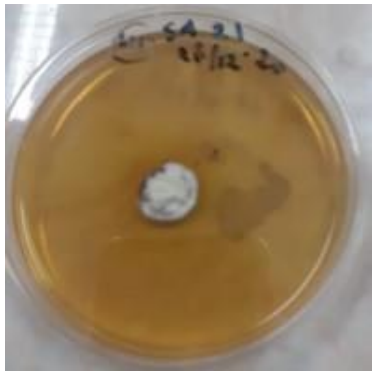

Figure 2.3. *Trichophyton mentagrophytes* colony of case 2

Figure 2.4. Clinical presentation (4 weeks after treatment) of case 2

Figure 3.1. Clinical presentation (before treatment) of case 3

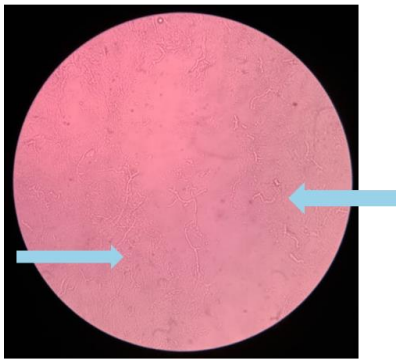

Figure 3.2. KOH examination showed septate hyphae (arrow) of case 3

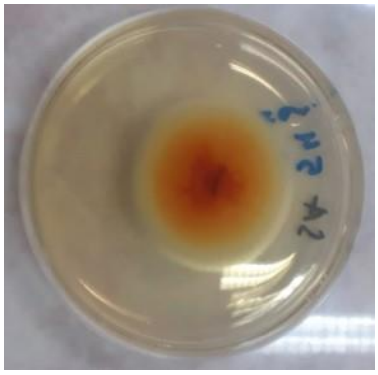

Figure 3.3. *Trichophyton tonsuran* colony of case 3

Figure 3.4. Clinical presentation (4 weeks after treatment) of case 3

Discussion

Dermatophytosis is a disease caused by the colonization of dermatophyte fungi that attack keratin-containing tissues such as the stratum corneum, hair and nails in humans and animals. The three genera that cause dermatophytosis are *Trichophyton, Microsporum, and Epidermophyton*.[8] In immunocompromised patients, HIV-AIDS, organ transplantation and etc., all species can be the cause of tinea.[9] In this three case series, case 1 patient had diabetes mellitus (DM), where patients with DM have a more frequent risk of fungal / bacterial infection. The risk factors for the patient in case 2 were hydronephrosis. Impaired kidney function is a concern because some types of antifungals can have an effect on the kidneys. The risk factor for the patient in case 3 was an autoimmune hemolytic anemia (AIHA) that had been suffered since 11 months, for which the patient had also received corticosteroids for 11 months.

Superficial fungal infections are a worldwide problem affecting more than 25% of the population. The frequency of dermatophytosis is also higher in communities with low socio-economic levels, warm and humid environments.[2,9] Risk factors for fungal infections include immunocompromised conditions, long-term use of corticosteroids, chemotherapy, pregnant women, DM, low socioeconomic conditions, high environmental humidity, and autoimmune conditions.[10] In all three cases of this series the patients had risk factors, including DM and CHF, hydronephrosis and AIHA, which lead to immunocompromising conditions in those patients and could increase the incidence of fungal infections.

The chief complaint of dermatophytosis is an erythematous patch that feels itchy, especially when sweating, in a humid location. Tinea corporis shows a varied clinical manifestation. The classic appearance is an annular and usually serpiginous (ringworm-like) lesion with an erythematous scale over the entire edge and often vesicles. The lesion extends centrifugally. The center of the lesion is usually clear without lesions (central clearing). The infection can spread from the scalp to the neck, upper body or buttocks and lower body. The severity varies greatly depending on the patient's immunity status.[11] Tinea cruris occurs between the thighs and inner upper leg. Predilection for tinea cruris includes the pubis, perineum, perianal, buttocks and inner upper leg areas.[12] The clinical diagnosis of tinea corporis and tinea cruris are confirmed by microscopic examination and culture. Materials for mycological examination should be taken by scraping the edges of the lesion that are elevated or active. Direct microscopic examination with 10-20% KOH shows hyphae (two straight parallel transparent lines, two-branched/dichotomous) with or without arthrospores. Culture examination with SDA culture media can be used to identify the type of fungal causes.[13] The three patients in this case report were diagnosed with tinea corporis and tinea cruris due to their classic clinical, physical and microbiology examinations.

Antifungal treatment of tinea corporis and tinea cruris can be given both topically and systemically depending on the extent of the lesion. The choice of systemic antifungals should pay attention to the patient's condition, because some systemic antifungals can have side effects and have special contraindications. The main choice of topical antifungals for tinea corporis and tinea cruris is the allylamine group (terbinafine cream, butenafine) twice a day for 1-2 weeks.[14] Systemic antifungals are given if the skin lesions are extensive and do not improve with topical administration. Some systemic antifungal options include terbinafine 250 mg/day (2-4 weeks), griseofulvin 500 mg/day (for 2-4 weeks), itraconazole 100 mg/day (1-2 weeks), and fluconazole 150-300 mg/day (4-6 weeks). In the selection of systemic antifungals, clinicians need to pay attention to the patient's condition. The following are side effects and contraindications to systemic antifungal administration (Table 1). Topical antifungals do not cause harmful side effects to patients, so their use tends to be safe in all conditions.[15]

Table 1. Side effects and contraindications of systemic antifungals[15]

Drug	Side Effects	Contraindication
Terbinafine	- Ageusia (altered taste), loss of smell, and tongue discoloration - Hepatotoxicity, hematologic disorders - GIT upset, aggravate psoriasis, lupus erythematosus	- Hepatic disease (chronic or active) - Renal impairment (creatinine clearance<50 mL/min)
Fluconazole	- Cardiac abnormalities (torsade de pointes), exfoliative skin reactions, anaphylactic reactions - Headache, myalgia, dizziness, GIT upset - Hepatic, renal functions abnormalities	- Hepatic and renal impairment - In patients with risk for arrhythmias - Coadministration with astemizole, terfenadine, cisapride (increased risk of developing torsade de pointes) - Coadministration with statins (increased myopathy)
Itraconazole	- Triad of hypertension, hypokalemia, edema in elderly - Negative inotropic fulminant hepatitis, Stevens–Johnson syndrome; Anaphylaxis - GIT upset - Headache, rhinitis, sinusitis, hepatic, renal impairment	- Heart failure - Liver disease - Patients with hypersensitivity to other azoles (use with caution)
Griseofulvin	- Hetaotoxicity, pancytopenia - Hypersensitivity skin eruptions, photosensitivity - GIT upset - Neurologic problems	- Porphyria - Liver Cell Failure - Patients with penicillin sensitivity (use with cautious) - Females using oral contraceptive pills should change the contraceptive method or add another form

The patient in case 1 had comorbidities DM and CHF, so was not given systemic itraconazole and fluconazole because could cause cardiovascular disorders, besides fluconazole is contraindicated in patients with CHF. The results of the fungal culture in case 1 showed the growth of *T. mentagrophytes* which was sensitive to terbinafine. In the case 1, the patient was given terbinafine 250 mg/day for 2 weeks, two weeks evaluation gave good results. The choice of terbinafine in case 1 was because it has no side effects on the cardiovascular system. Patient case 2 had comorbid hydronephrosis grade four, so the patient was not given systemic terbinafine and fluconazole because they are contraindicated in individuals with impaired renal function. The results of the fungal culture in case 2 showed the growth of *T. mentagrophytes* which was sensitive to griseofulvin. Patient case 2 was given griseofulvin 500 mg/day for 4 weeks, after which the evaluation gave good results. Griseofulvin was chosen in case 2 because it has no side effects on the neurourinary system. Patient case 3 had comorbid AIHA, so systemic terbinafine was not given because it could cause side effects of hematological disorders, and griseofulvin could cause pancytopenia. The results of the fungal culture in case 3 showed the growth of *T. tonsurans* which was sensitive to itraconazole. Case 3 patient was given itraconazole 100 mg/day for 2 weeks, after which the evaluation gave good results. The choice of itraconazole in case 3 was because itraconazole had no side effects on the hematological system.

Education plays an important role in the successful therapy of skin fungal infections. Patients should be educated to maintain personal hygiene, adhere to the medications given to prevent drug resistance, wear clothes that are not tight and which can absorb sweat.[3]

Conclusion

Dermatophytosis is a fungal infection of the skin that often occurs in immunocompromised patients. Choosing the right antifungal therapy with regard to side effects and contraindications is important for the patient, especially those cases

with comorbidities. Education plays an important role in the success of therapy.

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