

## Tinea Corporis Therapy

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### Abstract

Tinea corporis is one of the skin diseases caused by dermatophyte fungi and is a fairly common disease caused by *Trichophyton* species. Tinea corporis mainly occurs in tropical countries or regions such as Southeast Asia and North America. Patients with tinea corporis usually have high activities and actively sweat. Tinea corporis has typical symptoms, i.e. the presence of patches of erythematous plaque that are circumscribed, round or oval shapes, and common predilection in the body trunk. Therapy of tinea corporis disease can use topical antifungals such as clotrimazole, ketoconazole, miconazole, naphthylamine, and terbinafine. In cases of systemic infection, oral antifungals such as terbinafine, itraconazole, fluconazole, and griseofulvin can be drugs of choice. Appropriate treatment of tinea corporis gives a good prognosis and prevents resistance and recurrence.

**Keywords:** dermatophytosis, oral antifungal, tinea corporis, topical antifungal

### *Terapi pada Tinea Corporis*

#### Abstrak

Penyakit kulit tinea corporis disebabkan oleh jamur dermatofita dari spesies *Trichophyton*. Tinea corporis terutama terjadi pada negara atau daerah yang memiliki iklim tropis seperti Asia Tenggara dan Amerika Utara. Penderita tinea corporis biasanya memiliki aktifitas yang tinggi dan aktif berkeringat. Tinea corporis memiliki gejala yang khas yaitu adanya bercak eritematous plak berbatas tegas dan memiliki bentuk bulat atau oval dan tempat predileksinya sering terjadi pada batang tubuh. Terapi yang digunakan untuk mengobati penyakit tinea corporis ini dapat menggunakan pilihan beberapa antijamur topikal seperti klotrimazole, ketokonazole, miconazole, naftilina dan terbinafine. Antijamur oral digunakan apabila terjadi infeksi sistemik dengan pilihan obatnya yaitu terbinafine, itrakonazole, fluconazole dan griseofulvin. Pengobatan yang tepat pada tinea corporis ini berprognosis baik dan mencegah terjadinya resistensi dan kekambuhan.

**Kata Kunci:** antijamur oral, antijamur topikal, dermatofitosis, tinea corporis

### Introduction

Tinea corporis is a superficial dermatophytosis skin infection characterized by signs of inflammation or sores on the skin.<sup>4</sup> Tinea corporis is often referred to as 'ringworm'. The most common causative species is *Trichophyton*. This species can digest keratin in the cells of the stratum corneum.<sup>8</sup> Tinea corporis is a superficial dermatophyte infection. This disease often occurs, especially in patients who often do activities that produce a lot of sweat and especially live in tropical areas that have high sun exposure. Morphology of this species is usually characterized by the appearance of well-defined patches or plaques, oval or round in shape, mildly

erythematous and scaly with slightly raised front edges. Mild pruritus may sometimes occur. Tinea corporis can be treated with topical antifungals. However, if the lesions are extensive, multiple, chronic, recurrent, or unresponsive to treatment with topical antifungals and in immunocompromised patients, antifungal treatment can be administered for systemic therapy.<sup>1,7</sup>

### Etiology

Tinea corporis is one of the superficial fungal infections of dermatophytosis. The most common cause of tinea corporis is *Trichophyton rubrum*, followed by *Trichophyton tonsurans* and

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*Microsporum canis*. *Trychpphyton rubrum* is the most common cause of dermatophytosis worldwide and is mostly found in North America. The cause of tinea corporis found in Southeast Asia is *Trichophyton interdigitale*.<sup>1,5</sup> Infection can occur usually due to direct contact between skin and soil, animals, or other human skin. Secondary infections usually occur due to direct contact with patients with tinea and the causative species is *Trichophyton tonsurans*. Direct contact between wrestlers can cause tinea corporis gladiatorum. In addition, tinea corporis can occur due to close contact with *Trichophyton schoenleinii*.<sup>17</sup>

## Epidemiology

Tinea corporis which is an infectious dermatophytosis disease that can occur all over the world, especially in the tropics. Tinea corporis is endemic to Southeast Asia, Central and South America, the South Pacific, and the Southwest Pacific. Tinea corporis often infects post-pubertal children and young adults.<sup>1</sup> In Indonesia alone, the prevalence of dermatophytosis is 53% of all fungal infections and is dominated by tinea corporis. Women are more susceptible to tinea corporis and the average age of sufferers is 40-50 years.<sup>10</sup> The mode of transmission of tinea corporis disease is through contact of the skin of a person suffering from tinea corporis to a healthy person or contact with surface objects such as clothes or towels.<sup>7</sup> Hygiene in fungal infections is very important because poor sanitation has a very bad impact, especially in areas with tropical climates.

## Pathogenesis

The cell walls of some dermatophyte fungi have Mannan which has immune-inhibiting properties. Therefore, the fungi can remain on the skin without exfoliating before finally attacking the skin. Infection is usually confined to the outer layers of the skin. In healthy immunocompetent hosts, fungi do not penetrate deeper tissues due to host defense mechanisms, activation of serum inhibitory factors, polymorphonuclear leukocytes, and complement. The response of the immune system to fungal infections can cause an increase in the proliferation of epidermal cells. The fungi that cause tinea corporis can produce protease enzymes that digest keratin. Fungi also produce the enzyme serine-subtilisin which digests protein. These fungi can also produce the enzyme keratinase, which penetrates the keratinized tissue

causing the fungi to attack the horny layer of the skin and then spread to the outside.<sup>1,6</sup> The immune response caused by fungi infection derived from nonspecific host mechanisms to humoral and cellular immune responses. This cell-mediated immune response is responsible for controlling the dermatophytosis.<sup>16</sup>

## Clinical Manifestations



Figure 1. Appearance of Tinea corporis on the skin.<sup>6</sup>

Clinical manifestations of tinea corporis disease can occur starting in 1 to 3 weeks. The description that appears is well-defined patches or plaques, oval or circular in shape, erythematous, accompanied by scales with slightly protruding edges (Fig. 1).<sup>6</sup> Lesions in the center can form an annular lesion that is characteristically hypopigmented or brown in color in the center. Usually these lesions tend to become less active as they expand outward. The borders of these lesions become annular, irregular, popular, vesicular, or pustular. The resulting lesions are usually asymmetrically distributed. In tinea corporis infection, multiple lesions may occur. The most common site of predilection in children and adolescents is the trunk, whereas in adults it is on exposed skin.<sup>1,9</sup>

Several clinical variants found from tinea corporis, namely:

### 1. Tinea corporis gladiatorum.

Tinea corporis gladiatorum is a dermatophytic fungal infection that is transmitted by skin-to-skin contact in wrestling or judo athletes. Most often caused by *T. tonsurans*.<sup>1</sup> Tinea corporis gladiatorum is often manifested on the scalp, neck and arms.<sup>2</sup> The lesion in tinea corporis gladiatorum is an erythematous lesion in the form of plaques, well-defined, annular and scaly.<sup>1</sup>

2. **Tinea incognita**  
Tinea incognita is a fungal infection that loses or changes its classic morphological characteristics due to the use of corticosteroids or calcineurin inhibitors. The clinical picture of tinea incognita is highly various, the lesions that can be seen are slightly erythematous and scaly, large lesions with indistinct borders with mild pruritus or usually not visible. Predilection is usually on the face and limbs.<sup>2</sup>
3. **Tinea corporis purpurica**  
Tinea corporis purpurica is caused by a fungal infection that usually occurs in individuals with compromised immune systems. The clinical picture appears to be macular purpura.<sup>1</sup>
4. **Tinea imbricata.**  
Tinea imbricata is a variant of tinea corporis that is mainly caused by *T. concentricum*.<sup>1</sup> The clinical picture seen on examination is an erythematous appearance that extends to form polycyclic and scaly plaques, arranged in concentric rings, annular which then over time become many which then become overlapping, the appearance of the plaque also becomes flat with the presence of thick scales on the surface that form a lace around it. Pruritus is common in tinea imbricata.<sup>2</sup>
5. **Tinea corporis bullosa.**  
Tinea corporis bullosa is a variant of tinea corporis with clinical features of vesicles or bullae, plaque-sized, scaly and erythematous. If the vesicles or bullae in tinea corporis bullosa rupture, they can cause erosions and crusts over the appearance of an erythematous lesion. Tinea corporis bullosa is rare.<sup>2</sup>
6. **Majocchi Granuloma**  
This variant of tinea corporis is an infection of the fungus *Trichophyton rubrum*. *Trichophyton interdigitale*, *Trichophyton violaceum*, *Trichophyton tonsurans* which is also called nodular granulomatous perifolliculitis is caused by the penetration of fungi along the hair follicles into the dermal or subcutaneous tissue

leading to suppurative folliculitis. Usually this disease is caused by occlusion of hair follicles or trauma to the skin in the dermis. It most commonly affects areas of the face or legs. The location is usually on the lower two thirds of the feet in women, who shave their legs. It also often occurs in individuals who have a compromised immune system and who are receiving topical corticosteroid therapy with nodular lesions and subcutaneous abscesses.<sup>1,2</sup>

### Diagnosis

The dermatophyte tinea corporis infection usually appears as annular, scaly, itchy patches or plaques, often with central clearing and an active border.<sup>12</sup> Microscopic examination of specimens or skin scrapings with 10-20% potassium hydroxide (KOH) shows the presence of hyphae and spores. Fungal culture can be carried out using seboraud agar as the gold standard to identify fungal species but it takes a long time, namely 1-2 weeks to up to 4 weeks to get results. The resulting positive culture may vary depending on the medium used.<sup>15</sup> Examination using ultraviolet light / Wood's lamp did not show good results because there was no fluorescence in the fungus that causes tinea corporis. A biopsy may also be performed if there are cases such as an annular scaly skin lesion with raised margins, or the presence of vesicles or pustules, or the presence of lesions appearing as overlapping concentric circles. Dermoscopy can be used as a diagnostic tool to show diffuse erythema, white scaly, discontinuous vessels with uneven distribution of periphery, peeling outwards with brown patches surrounded by a yellowish-white halo. The dermoscopy examination is quite good because the results are still visible even after being given corticosteroid therapy or calcineurin inhibitors. In addition, examination can also use the PCR method to identify exactly the fungus that causes tinea corporis.<sup>1,9</sup>

## Differential Diagnosis

There are several differential diagnoses for tinea corporis disease (Table 1).

Table 1. Differential Diagnosis of Tinea Corporis Disease.<sup>4,11,13,18</sup>

Disease name	Disease description
SCLE (Subacute cutaneous lupus erythematosus)	Found in sun-exposed areas, the clinical appearance is several scaly annular lesions.
Granuloma annulare	No scales, vesicles, or pustules; not itchy; fine; usually on the back of the hand or foot.
Erythema annulare centrifugum	Causes inflammation of the skin with the appearance of annular plaques. Etiology unknown.
Numular eczema	More scales and less likely to have central clearing.
Pityriasis rosea herald patch	A single lesion on the neck, trunk, or proximal extremities, may progress to a generalized rash within one to three weeks.
Plaque psoriasis	Well circumscribed, annular, erythematous, round or oval, pruritic plaque with loosely adherent silvery-white mica scales, positive Auspitz sign, Koebner phenomenon, nail pits, arthritis, uveitis, geographic tongue, positive family history.
Atopic dermatitis	The examination shows inflammation, eczema, xerosis, dry skin, lichenification and thickening.
Impetigo	Causes honey-colored appearance with surrounding erythema and crusted lesions in extremities.

## Complications

Tinea corporis is an infectious disease that can have a significant effect on psychological, social and occupational health. Complications that can be caused by scratching and abrasion of the skin are superinfection from secondary bacteria. Post-inflammation can also cause hypopigmentation or hyperpigmentation of the skin. Dermatophytid reactions which are secondary dermatitis eruptions can also occur as a result of therapy with systemic antifungals.

## Nonpharmacotherapy Management

The patient is advised to wear loose clothing and made from cotton so it can easily absorb moisture from the surface of the skin. The area of the skin that is affected by this fungal infection must be dried well before wearing clothes. Patients are advised to avoid walking barefoot and use cotton socks.<sup>16</sup>

## Pharmacotherapy Management

Treatment for tinea corporis fungal infection usually uses topical or oral medication therapy (Tables 2 and 3).

Table 2. Topical Drug Choice in The Treatment of Tinea Corporis.<sup>2,7</sup>

Choices of topical drug	Preparation	Method of administration
Clotrimazole	Cream/ointment/solution 1%	Apply twice daily
Ketoconazole	2% cream/shampoo/gel/foam	Apply once a day
Miconazole	2% cream/ointment/solution/lotion/powder	Apply twice daily
Naftifine	1% cream	Apply daily or 1% or 2% gel twice daily
Terbinafine	1% cream/gel/ solution	Spray solution or twice daily

Treatment with oral medications is necessary if there is widespread systemic infection or if it

occurs in cases of failure of treatment with topical therapy.

Table 3. Choice of Oral Drugs in The Treatment of Tinea Corporis.<sup>3,4</sup>

Choices of oral drug	Dosage (adults)	Dosage (children)
Terbinafine	250 mg once daily for two weeks.	Body Weight 10-20 kg: 62.5 mg/day Body weight 20-40 kg: 125 mg/day Body weight above 40 kg: 250 mg/day
Itraconazole	100 mg once daily for two weeks or 200 mg once daily for one week	3 to 5 mg/kg per day (up to 200 mg per day)
Flukonazol	150-200 mg once weekly or 50-100 mg once daily for 2-4 weeks	6 mg/kg once a week
Griseofulvin	500-1000 mg once daily for 2-4 weeks	griseofulvin microsize 10 to 20 mg/kg per day griseofulvin ultramicrosize 5 to 15 mg/kg per day

Terbinafine is very effective for the treatment tinea corporis. Terbinafine is also more effective than griseofulvin. A study compared terbinafine with griseofulvin, both of which were given at the same dose of 500 mg daily for 6 weeks. The results found that the cure rate for tinea corporis was about 87% in the terbinafine group compared to 73% in the griseofulvin group.<sup>20</sup> Nystatin is not very effective for tinea corporis. Griseofulvin is also less effective and requires a long treatment time, has many side effects and is not available in all countries. Oral ketoconazole should be avoided because it has several risks, namely hepatotoxicity, adrenal insufficiency, and drug interactions. Terbinafine therapy gives good results in treating tinea corporis by inhibiting the enzyme squalene epoxidase, which is useful in the synthesis of ergosterol which is an important component of fungal cell walls. Combination therapy between topical drugs and oral drugs can increase the cure rate.<sup>3,11</sup> The duration of drug administration depends on the response to treatment, the average is given 2-4 weeks. In cases that are difficult to treat, it can be given with a longer administration time.<sup>19</sup>

Treatment of fungal infections must be adhered to so that treatment failure does not occur as well as drug resistance and repeated infections due to close contact with patients and auto-inoculation can also occur.<sup>4,10</sup>

### Prevention

Prevention in tinea corporis disease is to avoid direct contact with people with tinea corporis. It is also necessary to avoid contact with clothing worn by infected patients. Patients are expected to use light and loose clothing to keep the skin clean and

dry.<sup>1,3</sup> If someone accidentally comes into contact with a lesion in a patient with tinea corporis, wash hands immediately with soap.<sup>20</sup>

### Prognosis

The prognosis for patients with tinea corporis is very good. Combination treatment using topical and oral antifungal drugs can improve healing. Appropriate treatment, patient compliance and treatment that is not stopped too quickly or suddenly can prevent the recurrence of tinea corporis disease. tinea corporis usually cure on its own after two to three weeks of treatment.<sup>14</sup>

### Conclusion

Tinea corporis disease caused by dermatophosis fungus are easier to diagnose if it shows typical lesions. Several topical antifungal drugs of choice, namely clotrimazole, ketoconazole, miconazole, naphthyline and terbinafine can help treat tinea corporis disease. In addition to topical antifungals, oral antifungals can also be given which are used in cases of systemic infection with several choices of topical antifungal drugs, namely terbinafine, itraconazole, fluconazole and griseofulvin. Adherence therapy for tinea corporis can help treat patients and prevent treatment failure, resistance and disease recurrence.

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