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AN OVERVIEW ON PHARMACOTHERAPY OF JOCK ITCH (TINEA CRURIS)

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ABSTRACT

Jock itch is a most common skin infection of the groin and adjacent skin throughout the world. It is caused by dermatophytic fungi *Tinea cruris.* Predisposing factors include heat, humidity, and hyperhidrosis, common accompaniments of high school–aged athletes. Usually the condition is easily diagnosed and responds well to treatment. Therapy consists of administering antifungal medications and keeping the warm, moist environment of the groin area as cool and dry as possible. After the skin disturbance clears, measures should be taken to prevent recurrent infection.

KEYWORD: Tinea, fungal infection, skin infection, jock itch, dermatophyte.

INTRODUCTION

The meaning of term tinea is fungal infection, where as dermatophyte refers to the fungal organisms that cause tinea. The most common infections in prepubertal children are tinea corporis and tinea capitis, whereas adolescents and adults are more likely to develop tinea cruris, tinea pedis, and tinea unguium (onychomycosis). Tinea infections can be difficult to diagnose and treat. Tinea cruris (jock itch) most commonly affects adolescent and young adult males, and involves the portion of the upper thigh opposite the scrotum. The scrotum itself is usually spared in tinea cruris, but involved in candidiasis.[1]

Tinea cruris is a special form of tinea that involves the crural fold (groin). It is far more common in men than in women. It often begins after physical activities that cause sweating.[2]

Each of these fungal infections is named for the part of the body infected. The most common sites are.

- tinea capitis, on the scalp;
- tinea corporis, on the body, excluding the groin, feet, hands, beard region, and scalp;
- tinea pedis ("athlete's foot") and manus, on the feet and hands;
- tinea unguium, under the nails;
- tinea cruris ("jock itch"), on the groin area.[3]

Tinea cruris is commonly called "jock itch." The crotch and buttocks of adult men are most frequently affected; the scrotum is rarely involved. The same type of skin lesion as in tinea corporis appears, often symmetrically. Itching is intense. The treatments are topical and oral antifungal agents.[4]

Tinea is a contagious fungal skin infection. The most commonly affected areas include the feet, groin, scalp and beneath the breasts. Tinea can be spread by skin-to-skin contact or indirectly through towels, clothes or floors. Tinea is also known as ringworm, which is a misleading name as no worm is involved.

All fungi need warm, moist environments and tinea is no exception. This is why the hottest, most sweat-prone areas of the body are the most likely areas for a tinea infection to occur. Communal showers and locker rooms are typical places where infection may be spread.[5]

Clinical features

The symptoms can include: Itching, burning and stinging and the skin may be flaky or scaly. Tinea cruris usually begins with a red patch high in the inner aspect of one or both thighs (usually opposite the scrotum in men). As it spreads, a clearing in the center is often seen and the outside edges are slightly elevated, red, and have a sharp border. Very tiny blister-like lesions can sometimes be seen along the border. The rash can spread down the thighs, up into the pubic region and even extend onto the buttocks.[2,5,9]

Etiology

Jock itch is caused by by dermatophytic fungi *Tinea cruris*, that can be spread from person to person or from shared use of contaminated towels or clothing. Jock itch is often caused by the same fungus that results in athlete's foot. It's common for the infection to spread from the feet to the groin, as the fungus can travel on your hands or on a towel.[9]

Risk factors

Risk factors for developing jock itch include the following

- **Gender**: Men are more likely than women to develop jock itch.
- **Weight**: Overweight people have more skin folds, which are the best climate for fungal infections including jock itch to occur.
- **Sweating profusely**: If a person sweats a lot, their skin is more suited for fungus to grow
- **Age**: Teenagers are more likely to develop jock itch.
- **Wearing tight clothing and underwear**: Tight fabrics trap moisture against skin and create a prime environment for fungus to grow.
- **Having a weak immune system**: People with weakened immune systems are more likely trusted source to develop fungal infections like jock itch than others.
- **Having diabetes**: People with diabetes are more prone to skin infections including jock itch.[10]

Pathophysiology

The primary causative fungal agents of tinea cruris include *Epidermophyton floccosum* and *Trichophyton rubrum*, with *Trichophyton mentagrophytes*, *Trichophyton verrucosum*, and *Trichophyton interdigitale* less commonly involved. *Epidermophyton floccosum* is most associated with outbreaks, while *T rubrum* remains the most common cause worldwide.

In economically poor and endemic areas, these infections are primarily found in children. Medical access issues also lead to high rates of treatment failure in these areas.

The dermatophytes of tinea cruris grow in keratinized dead tissue with their metabolites, enzymes (keratinases), and antigens spreading throughout adjacent living tissue and generating an immune reaction. The stratum corneum and terminal hair most frequently are affected and result in the typical clinical presentation. The lesions expand centrifugally with most growth at the periphery.

Tinea cruris is a contagious infection spread by fomites or by autoinoculation from another fungal infection of the hands or feet (eg, tinea manuum, tinea pedis, or tinea unguium). The main factors responsible for dermatophyte spread include poor living conditions, urban areas with dense population, and social activities of traveling and sports.[6,7]

Diagnosis

Examination of scrapings from the lesion can be done and will show typical fungal features. Conditions that mimic tinea cruris include psoriasis, seborrheic dermatitis, and intertrigo.[2]

Laboratory diagnosis

Several standardized methods are available for the clinical diagnosis and laboratory diagnosis of dermatophytoses. The following specimens are collected by a sterile scalpel blade depending on clinical type. Infected hair is selected by exposure to Wood's lamp (UV light). Infected hair will fluoresce under Wood's lamp. Therefore, Wood's lamp is used for the diagnosis of tinea capitis. It is an UV lamp emitting radiation at 365 nm (Fig 1).

• Skin scrapings from edges of ringworm lesions

• Nail clippings

• Hair stubs

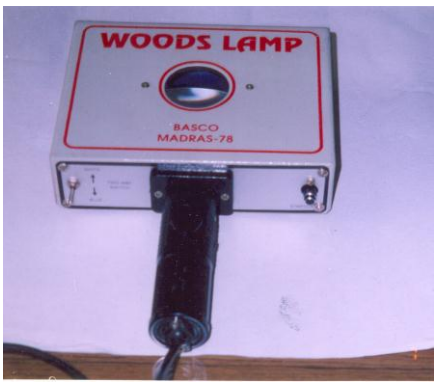

Fig. 1: Wood's lamp.

The most important laboratory methods are direct microscopic examination in 10% KOH wet mount or calcofluor white mount (fungal cell wall stain viewed under fluorescent microscope) to demonstrate septate hyphae and arthrospores (In lesions/ clinical samples, dermatophytes appear as hyphae and arthrospores/ arthroconidia), study of colony characteristics by isolating organisms on Sabouraud's dextrose agar (SDA) with chloramphenicol and cycloheximide and microscopic examination of teased mounts in lactophenol cotton blue wet mount preparations to differentiate *Trichophyton*, *Microsporum*, *Epidermophyton* based on morphology of the microconidia and macroconidia.[6]

Pharmacotherapy

Tinea cruris often can be cured using topical antifungal medications. Generally, topical antifungal treatment requires once or twice daily dosing for two weeks. The two main classes

of antifungal medications are azoles and allylamines. Azoles inhibit the enzyme lanosterol 14a-demethylase, thus reducing the formation of ergosterol, a critical component of fungal cell walls. Membrane damage and permeability leads to a fungistatic effect. Allylamines inhibit the enzyme squalene epoxidase that generates ergosterol from squalene, leading to fungicidal buildup of toxic levels of squalene in the cells. Terbinafine and naftifine are allylamine treatment options, whereas butenafine is a benzylamine antifungal agent that is structurally similar to allylamines. Ciclopirox olamine also is an effective antifungal commonly recommended for twice daily use for 4 weeks. Its unique mechanism of action involves disrupting iron-dependent enzyme systems and cytoplasmic membranes. The US Food and Drug Administration–approved azole treatments include ketoconazole, econazole, oxiconazole, clotrimazole, and miconazole.[2,3,7]

Fungal infections are treated by two primary routes: topical or systemic medications. Topical antifungal medication is appropriate initial treatment for skin infections (tinea corporis, pedis, manus, and cruris), unless the infection involves an extensive area.[2,3,7]

Topical treatment is typically with an antifungal cream, such as clotrimazole (LotriminTM 1% cream or lotion), terbinafine (LamisilTM), ketoconazole (NizoralTM), or one of many others. Of note, Nystatin is not effective for tinea cruris. These lotions or creams should be applied once or twice a day to the entire rash and at least 2 centimeters beyond the borders of the rash for a minimum of four weeks. Treatment should generally be continued for one week after resolution of rash.[2,3,7]

Precautions to avoid tinea cruris

Overheating and perspiration contribute to tinea infections. Suggestions to avoid tinea infection include.

1) After washing, dry the skin thoroughly, particularly between the toes and within skin folds.
2) Expose the skin to the air as much as possible.
3) Wear cotton socks instead of synthetics.
4) Use antiperspirants to control excessive perspiration (sweating).
5) Wear thongs to swimming pools, locker rooms, gyms and other communal areas.
6) Hot baths and tight fitting clothing should be avoided.
7) Males may do better wearing boxers rather than briefs and women should wear cotton underwear and avoid tight- fitting pants.[2,5,8]

Preventing the spread of tinea cruris

It is important to remember that tinea is contagious. Suggestions on how to prevent the spread of infection to others include:

1) Treat tinea infections with antifungal cream.
2) Wash your hands after touching infected areas.
3) Do not share towels.
4) Do not walk around barefoot if you have tinea pedis (tinea of the feet).
5) Clean the shower, bath and bathroom floor after use.
6) Maintain good personal hygiene.[5,6,8]

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