CMPT Mycology Plus Program

Innovation, Education, Quality Assessment, Continual Improvement

Challenge 0909-2

September 2009

Trichophyton tonsurans -skin scraping, athlete's foot

HISTORY

This sample was sent as simulated skin scrapings from an athlete's foot. Laboratories were expected to isolate and identify *Trichophyton tonsurans.*

CMPT QA

The sample was verified by a reference laboratory. *Trichophyton tonsurans* was isolated as 4+ pure culture, viable for 27 days.

SURVEY RESULTS

Identification

All laboratories that processed the sample were able to isolate and identify it at least up to *Trichophyton* genera (see Table 1). Sixty four percent of the laboratories correctly identified the isolate as *T. tonsurans;* one laboratory each reported *T. mentagrophytes, T. rubrum,* and *Trychophyto*n sp. One laboratory reported it does not normally process this kind of sample.

IDENTIFICATION

T. tonsurans grows readily on Sabouraud's agar and produces colonies with various types of colors and surface textures. [1]

Microscopic morphology

Hyphae are septate, with many variable shaped microconidia all along the hyphae or on short conidiophores that are perpendicular to the parent hyphae.

Microconidia are produced laterally on undifferentiated hyphae or on simple conidiophores. They are usually teardrop or club shaped but may be elongate or enlarge to round "balloon" forms. Intercalary and terminal chlamydoconidia are common in older cultures. [1, 2, 3]

Macroconidia are rare, irregular in form, and a bit thick walled. It may have spiral coils and arthroconidia. [3]

Colony morphology (figure 1)

Trichophyton tonsurans is considered moderately slow growing as colonies mature in about 12 days on Sabouraud's dextrose agar. This species has a partial requirement for thiamine.

Highly variable; the surface may be white, grayish, yellow, rose, or brownish; usually suede-like, with many radial or concentric folds. Reverse is usually reddish brown; sometimes it is yellow or colorless. [1, 3]

Figure 1. Morphology exhibited by a *Trichophyton tonsurans* fungal colony. CDC image library ID 11013. Dr. Libero Ajello

T. tonsurans

Differential diagnosis

T. mentagrophytes: microconidia are very round and clustered; macroconidia are cigar shaped and thin walled; coiled spiral hyphae are often seen.

T. rubrum: microconidia usually form singly all along the sides of the hyphae; macroconidia are long, narrow, and thinwalled, with parallel sides (pencil-like), and have 4-10 cells.

T. tonsurans and *T. mentagrophytes* are urease positive; *T. mentagrophytes* and *T. rubrum* grow in No6 - NH_4NO_3– *Trichophyton* agar; *T. tonsurans* does not.

Table 1: Results received – *Trichophyton tonsurans* challenge

Reported	No of labs	%
T. tonsurans -/+ presumptive, refer	7	63.6
T. mentagrophytes	1	9.1
T. rubrum	1	9.1
Trichopyton species	1	9.1
snnp	1	9.1
Total	11	100

snnp: sample not normally processed

CLINICAL RELEVANCE

T. tonsurans is an anthropophilic species most frequently causing tinea capitis and less frequently tinea corporis. [1]

In recent studies, *T. tonsurans* accounted for 50–90% of cases of tinea capitis in the UK, but was much less common in other regions, in particular the middle East.[6] *Trichophyton tonsurans* causes endothrix hair invasion. Hyphae grow down the hair follicle and then penetrate the hair shaft, leaving the cuticle surface of the hair intact. The hyphae within the hair convert to spores replacing the cortex. This may cause the hair shaft to weaken.

Trichophyton tonsurans has been the major etiological agent isolated from these diseases in North America. Nowadays, it is well known that many wrestling and judo participants in many countries are affected with tinea capitis and/or corporis by *T. tonsurans.* [4]

Tinea corporis caused by *T. tonsurans* may form various clinical types. Tinea corporis can present with an eczema-like pattern, black dot ringworm, or an inflammatory type like a kerion. [4]

Although the incidence of *Trichophyton tonsurans* dermatophytoses in adults is variable, this organism has emerged as a leading cause of pediatric dermatophytoses in the United States. As many as 1 in 20 children develop tinea capitis with *T. tonsurans*, and a significant larger proportion of children harbor the pathogen in an asymptomatic state. [5]

Collection of samples for examination for dermatophytes is traditionally done by scrapings or collection of scales and loose hairs. Recent studies demonstrate the efficacy of other tools including circular hair brushes, plastic toothbrushes, [7] and in particular sterile cytobrushes. [8]

TREATMENT

Ketoconazole, clotrimazole, itraconazole, terbinafine, naftifine, and amorolfine are in general active in vitro against *Trichophyton* species.

Terbinafine and itraconazole are now commonly used in treatment of infections due to *Trichophyton* species and other dermatophytes.

For treatment of tinea capitis and onychomycosis, oral therapy is usually preferred.

The Committee recommends that all Proficiency Testing samples should be processed as routine samples even when there is a staff shortage or high workload.

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