OUTBREAK OF TINEA CAPITIS BY Trichophyton tonsurans and Microsporum canis in Niterói, RJ, Brazil*  

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SUMMARY  

18 girls from an orphanage (Orfanato Santo Antônio) in Niterói presented tinea capitis due to Trichophyton tonsurans (15 cases — 83.3%) and Microsporum canis (3 cases — 16.7%). Comments are made about clinical, mycological and therapeutic aspects of this microepidemy.  

KEY WORDS: Dermatophytosis; Epidemy; Griseofulvin; Microsporum canis; Trichophyton tonsurans; Tinea capitis.  

INTRODUCTION  

Dermatophytosis is an important problem of public health in Brazil. The principal agent of this infection worldwide as well as in this country is Trichophyton rubrum, T. mentagrophytes, T. tonsurans, Microsporum canis, and Endermyophyton floccosum are also commonly isolated species. M. gypseum (complex), M. audouinii, T. verrucosum, T. violaceum, T. megini, T. schoenleinii, T. concentricum, occur less frequently, the latter causing endemic infection in certain areas of the country. M. cookei, M. nanum, M. persicolor, T. simii are geophytic dermatophytes occasionally isolated in Brazil.  

In the states located above the Tropic of Capricorn, Trichophyton tonsurans is an important agent of dermatophytosis and it seems to be well adapted to the environmental conditions of the Northern and Northeastern areas of Brazil, including the Amazon region where it is considered to be endemic and the most impor-
tant agent of tinea capitis. *Trichophyton tonsurans* is also prevalent in other parts of Latin America, including Mexico, Puerto Rico and El Salvador. This introduced dermatophyte, often brought by immigrants, may become the predominant agent of tinea capitis in regions or countries where the fungus has been imported.

In the southern part of Brazil, the principal agent of tinea capitis is *M. canis*, a zoophilic dermatophyte that causes cat ringworm and also frequently infects dogs. In Brazilian territory, tinea capitis is also caused by *T. mentagrophytes, T. rubrum, T. verrucosum, T. violaceum, M. gypseum, and M. audouini*.

Tinea capitis is the most common cutaneous fungal infection in children. Clinical infections are often due to one of two species: *M. canis*, which is often isolated from very young children, and *T. tonsurans*, which accounts for 90% of all cases of tinea capitis infecting children from kindergarten level and older.

The way in which the fungus invades the hair shaft determines the type of infection seen clinically. In *M. canis* infection, spores coat the outer surface of the hair shaft (ectothrix infection) and Wood’s light reveals a green blue colour. In *T. tonsurans* infection, spores are produced within the hair shaft (endothrix infection), resulting in brittle hairs that break off just above the surface of the scalp. Fluorescence with Wood’s lamp is negative. The shed hairs contain arthroconidia that remain viable in a non living substrate and may contaminate other people, thus spreading the infection. Tinea capitis by *T. tonsurans* has already reached epidemic proportions in Brazil, Mexico, Puerto Rico and the United States.

We report a series of 18 patients from an orphanage for girls in Niterói, RJ, Brazil, with “tinea capitis” by *T. tonsurans* and *M. canis*.

RESULTS

Clinical examinations revealed scalp lesions in 26 of the 80 girls in the orphanage (32.5%). Mycological examinations and cultures confirmed the diagnosis of “tinea capitis” in 18 of the 26 suspected cases (69.2%). Clinical appearances varied considerably (Table 1).

Direct examination demonstrated endothyrix infection in 15 cases and ectothrix infection in 3 patients. Endothrix infections were caused by *Trichophyton tonsurans*, the predominant organism in this outbreak, having been isolated from 15 of the 18 infected girls (83.3%). *M. canis* was the isolated etiologic agent of ectothrix cases (3/18 — 16.7%). Most endothrix infections were classified clinically as types 1 or 2, endothrix infections as types 3 or 4, overlap having been observed in 6 patients (6/18 — 33.3%). Lesions were limited to the scalp in all cases. Most children had already had scabies and/or pediculosis (lice), treated previously.

Therapy

Microsize griseofulvin was administered at a dosage of 10 mg/kg of body weight per day with a meal. The children were seen when therapy was started after the confirmation of the diagnosis by direct potassium hydroxide examination. They were seen again at follow-up visits 8 and 12 weeks later. Mycological examinations were performed at each visit. Within 8 weeks signs of infection were no longer observed, when therapy was withdrawn, and no relapse or reinfection seen in a 2 year follow-up period.
TABLE 1
Focus of tinea capitis in an orphanage for girls in Niterói, RJ, Brazil.

<table>
<thead>
<tr>
<th>Identification</th>
<th>Age (in years)</th>
<th>Ethnic origin</th>
<th>Time of evolution</th>
<th>Clinical appearance</th>
<th>Fungus isolated</th>
</tr>
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<tbody>
<tr>
<td>AT</td>
<td>9</td>
<td>b</td>
<td>3 months</td>
<td>3</td>
<td>M. canis</td>
</tr>
<tr>
<td>BA</td>
<td>7</td>
<td>w</td>
<td>3 months</td>
<td>2</td>
<td>M. canis</td>
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<tr>
<td>CM</td>
<td>8</td>
<td>w</td>
<td>2 months</td>
<td>4</td>
<td>M. canis</td>
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<tr>
<td>DT</td>
<td>9</td>
<td>m</td>
<td>4 months</td>
<td>4</td>
<td>T. tonsurans</td>
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<tr>
<td>EJ</td>
<td>7</td>
<td>m</td>
<td>4 months</td>
<td>3</td>
<td>T. tonsurans</td>
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<tr>
<td>FD</td>
<td>7</td>
<td>m</td>
<td>1 year</td>
<td>2</td>
<td>T. tonsurans</td>
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<tr>
<td>GC</td>
<td>9</td>
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<td>5 months</td>
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<tr>
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<td>2</td>
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<tr>
<td>IL</td>
<td>7</td>
<td>w</td>
<td>1 year</td>
<td>3</td>
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<tr>
<td>JP</td>
<td>8</td>
<td>w</td>
<td>6 months</td>
<td>2</td>
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<tr>
<td>KF</td>
<td>8</td>
<td>w</td>
<td>6 months</td>
<td>2</td>
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<tr>
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<td>6</td>
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<td>6 months</td>
<td>3</td>
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<tr>
<td>MM</td>
<td>8</td>
<td>m</td>
<td>1 month</td>
<td>3</td>
<td>T. tonsurans</td>
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<tr>
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<tr>
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<td>b</td>
<td>1 month</td>
<td>5</td>
<td>T. tonsurans</td>
</tr>
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</table>

Ethnic origin: b = black; w = white; m = mixed racial origin.
Clinical appearance: 1 = No or minimal hair loss, mild scaling; 2 = More extensive hair loss (more than one patch greater than 2 cm), mild scaling; 3 = More extensive hair loss, and moderate erythema and scaling; 4 = Extensive hair loss, severe erythema and scaling, crust formation; 5 = Highly inflammatory patches of hair loss, pustule formation, crusts (kerion).

DISCUSSION

The first two girls in our study were seen at the Dermatology Division of the Centro de Saúde Carlos Antônio da Silva in June of 1989. One of them presented with “black dot” tinea capitis caused by *T. tonsurans* and the other had gray patch ringworm by *M. canis*. The latter had just come from home leave where she used to play with a sick dog, but material from this animal could not be obtained for examination. The first girl had contact with her sister who had a scalp condition that responded to griseofulvin therapy in March 1989. The sister was also at the orphanage, but when examined, had no lesions and repeated mycological examinations were negative.

As these children were from an orphanage, and *Trichophyton tonsurans* is an anthropophic dermatophyte, capable of remaining viable in keratinised tissue, all the children in that institution were examined. Living in close confinement (orphanage) helped spread infestation (pediculosis and scabies), and infection (tinea capitis).

Epidemics of tinea capitis caused by *Trichophyton tonsurans* have been reported previously in Brazil even in areas where this dermatophyte is considered to be rare. This fungus is reported to be predominant among blacks, but it is also seen among individuals of Hispanic backgrounds. In our series there was no particular racial predominance and one third of the patients were of mixed racial origin.

Significant clinical overlap between endo-thrix infections by *T. tonsurans* and ecto-thrix infections by *M. canis* was also observed in a series of 22 tinea capitis patients infected by *M. canis*.
T. tonsurans and T. mentagrophytes (var. mentagrophytes) studied in Niterói. The clinical manifestations of tinea capitis by T. tonsurans were highly variable and nonspecific. They ranged from acute kerion (Fig. 1) to localized alopecia (Fig. 2) to a minor degree of scaling without appreciable alopecia (Fig. 3), some cases being virtually indistinguishable from dandruff on the basis of simple clinical examination (Fig. 4). Microsporum canis infection tended to be inflammatory (Fig. 5). The immune response of each patient with T-helper/T-suppressor lymphocyte interactions may play a role in the variability of clinical signs in tinea capitis by T. tonsurans. Atypical cases having also been reported in M. canis infections. A high index of suspicion together with acquisition of suitable material for mycologic examination were important in making the diagnosis, especially in atypical cases.

Fig. 1 — Trichophyton tonsurans kerion with suppuration, crusting and alopecia.

Fig. 2 — Hair loss, moderate scaling of the scalp due to Trichophyton tonsurans infection.

Fig. 3 — Non inflammatory confluent circular areas of alopecia caused by Trichophyton tonsurans.

Fig. 4 — Trichophyton tonsurans scalp infection with mild scaling and minimal hair loss, mimicking seborrheic dermatitis; associated pediculosis (arrow).

Fig. 5 — Scaling, crust formation and hair loss in tinea capitis caused by Microsporum canis.

The hair stubs or “black dots” must be examined and cultured, a small-bore sterile needle
often being necessary to prise them from the scalp. Potassium hydroxide examination of scalp
scrapings of scaly lesions may be helpful if “black dot” hair stubs are difficult to locate22.
Cultures are important for establishing the diagnosis and selecting therapy.

Griseofulvin is effective in treating dermatophytosis, being frequently used for scalp infections
and onychomycosis. However, although rare, treatment failures are seen21, 23. In these
cases itraconazole is a promising drug as initial of therapy reports in Trichophyton tonsurans
infection have shown good response14, 22. Griseofulvin is usually indicated in all forms of T. tonsurans
as well as in M. Canis tinea capitis12, 21, and good therapeutic results were obtained with it,
no side effects having been observed.

Considering the increasing incidence of scalp infections due to Trichophyton tonsurans,
it is important to keep in mind its often confusing clinical signs. It should be considered as
a possible diagnosis in any patient with hair loss, scaling and/or inflammation on the scalp. Myco-
logical tests should be performed in every patient in whom the diagnosis is suspected, including
adults21. Trichophyton tonsurans infection can continue into adulthood, the clinical presentation of adult disease often mimicking seborrheic dermatitis24, 26. Classical black-dot type can also be seen in these patients25. Adults with scalp ringworm and asymptomatic adult carriers of T. tonsurans may provide a source for continued reinfection in children, examination of all household members being recommen-
ded21.

This outbreak was caused by two different species and fungi were probably introduced among orphanage girls from different sources. In a focus of infection it is uncommon to find more than one species to be causative agent, as in the series described here.

RESUMO

Microepidemia de tênia do couro cabeludo por Trichophyton tonsurans e Microsporum canis
em Niterói, RJ, Brasil.

18 meninas internas do Orfanato Santo Antônio em Niterói apresentaram tênia do couro
cabeludo causada por Trichophyton tonsurans (15 casos — 83,3%) e Microsporum canis (3 casos
— 26,7%). São discutidos aspectos clínicos e terapêuticos desta microepidemia.

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REFERENCES

1. ALTERAS, I. & FEUERMAN, E. J. — Atypical cases of Microsporum canis infection in the adult.

2. BABEL, D. E. & BAUGHMAN, S. A. — Evaluation of the adult carrier state in juvenile tinea capitis caused by

3. BABEL, D. E.; ROGERS, A. L. & BENECK, E. S. — Dermatophytosis of the scalp: Incidence, immune response,

4. BASSANESI, M. C.; ANNES, E. & SEVERO, L. C. — Microepidemia por Trichophyton tonsurans em internato


8. FONSECA FILHO, O. — Sobre a Tênia imperitada (Toque-
   lao, Bâsénete do Chimbé) no continente americano e sua introdução si pelas migrações pré-históricas de indí-
   genas da Oceania, com algumas considerações de ordem geral sobre dermatófitos e dermatofíteses. J. bras. Med.,

9. FURTADO, M. S. S.; IHARA, L. T.; MAROJA, M. F.; JO-
   SÉ, J. I. N. S. & CASTRILHÓN, A. L. — Dermatofíteses
   na cidade de Manaus (AM). An. bras. Derm., 62: 195-196,
   1987.


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