Trichophyton tonsurans in a family microepidemic

Microepidemia familiar por *Trichophyton tonsurans*

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Abstract: *Trichophyton tonsurans* is a highly transmissible anthropophilic dermatophyte fungus, which invades keratinized tissues. This study reports a case of family microepidemic caused by this dermatophyte. Despite their excellent hygiene conditions, it remained active for several years, spreading to all family members. The hypothesis that the fungus was being kept alive in the family home was confirmed after samples collected from it were analyzed. Pure cultures of the fungus were isolated and identified. After diagnosis, the house was disinfected with concomitant oral treatment for all family members.
Keywords: Family; Therapeutics; Tinea; *Trichophyton*

Resumo: *Trichophyton tonsurans* é um fungo dermatófito antropofílico de alta transmissibilidade que invade tecidos queratinizados. Relatamos um caso de microepidemia familiar causada por esse dermatófito no qual, apesar das ótimas condições de higiene, o fungo se manteve viável por vários anos, disseminando-se para todos os membros da família. A hipótese de que estivesse sendo mantido na residência da família foi confirmada após análise de amostras do domicílio, em que foram isoladas e identificadas culturas puras do fungo. Após o diagnóstico, a residência foi desinfetada e todos os membros da família receberam tratamento oral concomitantemente.
Palavras-chave: Família; Terapêutica; Tinha; *Trichophyton*

INTRODUCTION

Dermatophytes are fungi that cause mycoses mainly of the skin, hair and nails, invading these tissues and using keratin as substrate. They are classified into three genera: *Trichophyton, Microsporum* and *Epidermophyton* and characterized as anthropophilic, zoophilic or geophilic when carried by man, animal or soil, respectively. The *Trichophyton* genus is composed of several species, the main one being *T. rubrum*, although the considerable increase in isolated *T. tonsurans* is becoming a worldwide phenomenum and an important study object. [1,2] This species may cause dermatophytoses associated with skin and nail, but is more often isolated from scalp infections, mainly in school-aged children. [1,2,3]

The integrity of the epidermis behaves as a natural barrier. However, the efficiency of fungal dispersion is closely related to the high production of elements of dissemination, with local humidity a prerequisite for inoculation and survival of the dermatophyte in the skin. In addition, poor hygiene practices and immunologic factors also influence the installation, perpetuation and dissemination of a dermato-

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phytosis.

As it is not a disease of mandatory reporting, scientific epidemiological studies contribute for better comprehension of its worldwide distribution. Thus, we observed that the occurrence of *T. tonsurans* is more frequently reported in countries like the USA, United Kingdom, Haiti and Japan.[4,5,6,7] In Brazil, we observed predominance of isolation of this fungus in the North and Northeast regions, but it is also isolated as agent of scalp tinea in different regions of the country, as the Southeast and South. [1,2,3,8,9]

This report presents a case of family microepidemic by *T. tonsurans* involving all of the members of a family where, despite excellent hygienic conditions, the fungus remained viable for several years.

CASE REPORT

A four-month-old infant was taken to the dermatologist because there were multiple, well defined and pruriginous scalp lesions of the circular tonsure plaque type; the hairs had broken a few millimeters away from the scalp (Figure 1A).

During the appointment, the attention of the specialist was drawn to small hyperchromic lesions seen on several places of the mother's skin, especially on the arms, which were in contact with the child's head during breast-feeding (Figure 1B). The mother informed that those lesions had existed for 17 years, were intermittent and had been empirically treated several times as "allergy".

Both were referred to LEPAC (Teaching and Clinical Analysis Research Laboratory), at the State University of Maringá, for biological samples collection (scrapings of lesion scales from the mother's skin and fragments of tonsured hair from the baby) to investigate the presence of fungi. Direct mycological and culture tests were performed (Figure 2) in the presence and absence of inhibitors. In all of the samples filamentous fungi with morphological characteristics of *Trichophyton tonsurans* were isolated.

A family investigation was suggested and sample collection was taken from the seven-year-old brother and the father, as both presented lesions on the surface of the body, scalp and upper limbs, respectively (Figures 3). The results were identical to those found in the biological samples from the mother and the baby.

The most plausible hypothesis was that the dermatophyte was being maintained in the family home. Samples were subsequently collected from several places in the residence for confirmation. Compacted cotton disks, 60mm in diameter, sterilized by autoclaving at 121ºC for 15 minutes, were pressed for 30 seconds with sterilized tweezers on the places where samples would be collected. Each cotton disk was then placed on the surface of a Petri dish containing Sabouraud Dextrose Agar culture medium with 0.2mg/l added chloramphenicol. A total of 57 environmental samples were collected, including the telephone, door knobs, couches, toys, rugs, curtains, baby stroller, bed headboard, combs and baseboard trims in every room of the house.

Thirteen pure cultures were isolated and identified with fungi of the same genera and species found in the samples taken from the patients. In the environment, fungi were isolated from the following sites: rugs, curtains, baby stroller, bed headboard, baseboard trims from several rooms and combs.

The patients were treated, the infant with griseofulvin 11 mg/kg/day for six weeks while the others were prescribed itraconazole 100 mg/day for a period of 12 weeks. The efficacy of medication was evaluated by the clinical improvement of lesions and also laboratory confirmation that the microorganism had no

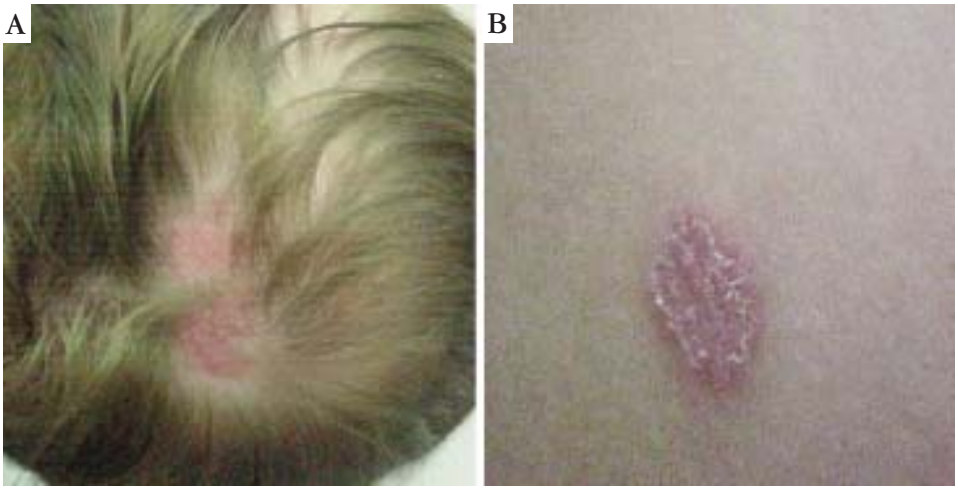

Figure 1: Cutaneous lesions in members of a family, from whom was isolated the o *Trichophyton tonsurans*. **A.** Tonsure plaques in the scalp of a four-month-old baby (case patient) and **B.** Erythemato-squamous, pruriginous, circinate lesion on the arm (mother)

Figure 2: Macroscopic aspects of a Trichophyton tonsurans colony in Sabouraud Dextrose Agar, 140 days at 250º C (characteristic granular light yellow surface, showing the development of deep radical furrows)

longer been detected in culture.

To guarantee that the fungus would be totally eradicated, personal clothes, bed linen and bathroom towels were disinfected with bleach, shoes were washed and sprinkled with commercial formaldehyde (Lysoform®). Wooden pieces of furniture were washed with bleach and then kerosene. The entire house floor was washed in the same way and then rinsed with clean water containing 5% Lysoform®. After this treatment the house was closed for a week and when the family returned a new cleaning with water and soap was done. The family was monitored for one year and in this period none of them presented recurrence of the pathology.

DISCUSSION

The facts led us to infer that this anthropophilic fungus was maintained in the stratum corneum of the adult woman, manifesting itself intermittently without having ever been correctly diagnosed. We believe that from this source there was dissemination of the pathogen to the other family members, characterizing a family microepidemic.

In adolescents and adults, *T. tonsurans* is usually asymptomatic, making infection control more difficult.[3] In children and infants the infection is characteristic and clinically important, especially due to hormonal immaturity.

In view of its transmissibility, *T. tonsurans* has been responsible for epidemic infections in judo players in several Japanese cities; it was isolated in an epidemic in a nursery school in Paris, an orphanage in Brazil and also in an epidemic involving patients and workers in a hospital.[7,8,10,11] Furthermore, in the United Kingdom a case of a family of veterinarians and two children who were simultaneously infected by *T. tonsurans* was reported. [12]

Dermatophytoses may be favored by poverty, malnutrition and poor hygiene habits.[1] In the case studied, on the contrary, the family is middle class, with a high degree of education, very well informed about health and hygiene issues; the mother did the housework and was extremely cautious and careful regarding cleanliness and disinfection. However, we point out that the fungus was isolated in porous sites, where retention of organic matter is possible, guaranteeing fungus preservation. It should be noted that on the telephone, doorknobs and toys, surfaces suspected of spreading microorganisms due to shared use, no fungus was found, an evidence of good hygiene conditions. It is easier to remove fungi in smooth surfaces that in porous ones.

In fact, *T. tonsurans* easily survives outside the host - the fungus was easily isolated from different

Figure 3: Cutaneous lesions on two other family membros, from whom the *Trichophyton tonsurans* was isolated. A. Irregular lesions on the scalp (brother, seven years old) and B. Macula and small vesicles in finger tegument (father)

places in the residence of the evaluated family. According to Pontes, it was the only anthropophilic fungus isolated in soil samples from public sites, together with geophilic or zoophilic fungi. This finding was attributed to the presence of many people at the evaluated places, where organic matter residues, such as skin scales and hair foster its growth and maintenance. [13]

Therefore, the transmission of the pathogen within the family group may have occurred indirectly (fomites scattered in the house) or directly (asymptomatic carriers), as in family epidemics and in restricted social contexts.

Based on our experience, the adult patients and the seven-year-old boy were treated with oral itraconazole, due to its effectiveness and safety.[14] The infant, on the other hand, was treated with griseofulvin. According to Gupta, this drug is the first choice for children, as long as there is dosage adjustment and treatment monitoring.[15] The remission of the disease in all of the family members was monitored for one year after the treatment, providing evidence that environmental disinfection, concomitant with the treatment, is of the utmost importance for extermination of sources of reinfection.

It is also pointed out that it is necessary to diagnose with the aid of adequate laboratory tests, having in mind that culture is fundamental for definition of differential diagnosis and also to define the condition of the asymptomatic carrier, as this knowledge define the adoption of adequate measures to fight the fungus, preventing its perpetuation and dissemination. ❑

REFERENCES

1. Chimelli PAV, Sofiatti AA, Nunes RS, Martins JEC. Dermatophyte agents in the city of São Paulo from 1992 to 2002. Rev Inst Med Trop Sao Paulo. 2003;45:259-63.
2. Brilhante RSN, Paixão GC, Salvino LK, Diógenes MJN, Bandeira SP, Rocha MFG, et al. Epidemiologia e ecologia das dermatofitoses na cidade de Fortaleza: o Trichophyton tonsurans como importante patógeno emergente da Tinea capitis. Rev Soc Bras Med Trop. 2000;33:417-25.
3. Bergerson CL, Fernandes NC. Tinea capitis: study of asymptomatic carriers and sick adolescents, adults and elderly who live with children with the disease. Rev Inst Med Trop Sao Paulo. 2001;43:87-91.
4. Coloe JR, Diab M, Moennich J, Diab D, Pawaskar M, Balkrishnan R, et al. Tinea capitis among children in the Columbus area, Ohio, USA. Mycoses. 2010;53:158-62.
5. Fuller LC. Changing face of Tinea capitis in Europe. Curr Opin Infect Dis. 2009;22:115-8.
6. Raccurt CP, Dorsainvil D, Boncy M, Boncy J, Auguste G. The emergence of Trichophyton tonsurans in Port-au-Prince, Haiti. Med. Mycol. 2009;47:197-200.
7. Shinoda H, Nishimoto, Mochizuki T. Screening examination of Trichophyton tonsurans among Judo practitioners at the All Japan Inter High School Championships, Saga 2007. Nippon Ishinkin Gakkai Zasshi. 2008;49:305-9.
8. Towersey L, Hay RJ, Monteiro MH, Lago MB, Martins ECS, Estrella RR. Outbreak of Tinea capitis by Trichophyton tonsurans and Microsporum canis in Niteroi, RJ, Brazil. Rev Inst Med Trop Sao Paulo. 1992;34:233-8.
9. Oliveira CP, Guilhermetti E, Kioshima ES, Pedra MR, Svidzinski TIE. Tinea capitis em Maringá, Paraná: um estudo de 11 anos. An Bras Dermatol. 2002;77:321-8.
10. Viguié-Vallanet C, Serre M, Masliah L, Tourte-Schaefer C. Epidemic of Trichophyton tonsurans tinea capitis in a nursery school in the Southern suburbs of Paris. Ann Dermatol Venereol. 2005;132:432-8.
11. Lewis SM, Lewis BG. Nosocomial transmission of Trichophyton tonsurans tinea corporis in a rehabilitation hospital. Infect Control Hosp Epidemiol. 1997;18:322-5.
12. Ravenscroft J, Goodfieldand MJD, Evans EGV. Trichophyton tonsurans Tinea Capitis and Tinea Corporis: Treatment and follow-up of four affected family members. Pediatr Dermatol. 2001;17:407-9.
13. Pontes ZBS, Oliveira AC. Dermatophytes from urban soils in João Pessoa, Paraíba, Brazil. Rev Argent Microbiol. 2008;40:161-3.
14. Gupta AK, Hofstader SL, Adam P, Summerbell RC. Tinea capitis: an overview with emphasis on management. Pediatr Dermatol. 1999;16:171-89.
15. Gupta AK, Cooper EA, Bowen JE. Meta-analysis: griseofulvin efficacy in the treatment of tinea capitis. J Drugs Dermatol. 2008;7:369-72.

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