Tinea capitis micro-epidemic by *Microsporum canis* in a day care center of Vitória - Espírito Santo (Brazil)*

*Microepidemia de tinha do couro cabeludo por Microsporum canis em creche de Vitória - Espírito Santo (Brasil)**

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Abstract: Tinea Capitis of the scalp is an infection of the skin and hair of this area caused by the dermatophytes of the *Microsporum* and *Trichophyton* genus. It preferentially attacks pre-school and school children due to their greater contact with infection sources. The authors report a micro-epidemic of *Tinea Capitis* of the scalp in 11 children of a day care center of Vitória (ES), between two and six years of age, 61% of masculine sex. They presented rounded, scaly lesions with tonsured hair, large and unique in the frontal, occipital and parietal regions. In two cases the scalp was diffusely attacked. The direct mycology showed parasitism of the ectothrix type, and 45.5% of the cultures were positive for Microsporum canis, justified by the history of contact between some children of the day care center and stray dogs of the district.
Keywords: Mycoses; *Microsporum*; Tinea capitis

***Resumo**: Tinha do couro cabeludo é infecção da pele e cabelos dessa área, causada pelos dermatófitos do gênero Microsporum e Trichophyton. Acomete preferencialmente crianças pré-escolares e escolares, devido ao maior contato com fontes de infecção. Os autores relatam uma microepidemia de tinha do couro cabeludo em 11 crianças de uma creche pública de Vitória (ES), entre dois e seis anos de idade, 61% do sexo masculino. Apresentavam lesões arredondadas, escamosas, tonsurantes, grandes e únicas, nas regiões frontal, occipital, parietal, e, em dois casos, o couro cabeludo estava difusamente acometido. Os micológicos diretos mostravam parasitismo tipo ectotrix, e 45,5% das culturas foram positivas para Microsporum canis, justificadas pela história de contato entre algumas crianças da creche e cães errantes pelo bairro.*
Palavras-chave: Micoses; Microsporum; Tinha do couro cabeludo

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INTRODUCTION

Tinea of the scalp or tinea capitis is a skin and hair infection of the scalp caused by dermatophytes of the genu *Microsporum* and *Trychophyton*. It is surface mycosis of universal distribution with predilection for tropical and sub-tropical regions, constituting a public health problem in some countries.[1]

The prevalence of the dermatophytes is variable in the diverse regions of the world and within the same country due to factors such as climate, socio-economical and hygienic conditions of the population, urbanization, immunological system of the host, fungal characteristics and therapeutic actions.[1-3] *Tinea capitis* caused by the *Microsporum canis* is most frequent in the North of Africa, Europe, Asia and Brazil (South, São Paulo, Rio de Janeiro, Espírito Santo and Goiânia Regions) and the *Trichophyton tonsurans* in the United States of America, Caribbean, Central America, Australia and Brazil (North and Northeast regions, DF and Paraná).[2-7]

It most frequently affects children below 10 years of age, pre-school and school range and rarely in post-menopause and immune-compromised women.[3,8]

The scalp tineas are exogenous infections having man as source of contagion (anthropophilic fungi such as the *Trichophyton tonsurans*), aanimals (zoophilic fungi, such as the *Microsporum canis*) and, more rarely the soil (geophilic fungi such as the *Microsporum gypseum*).[1,2,9] Zoophilic dermatophytes determine lesions in the exposed areas of the body (scalp, arms, hands and feet) by direct contact with domestic animals (dogs and cats) or with their hair deposited in the house environment.[10,11] The *Microsporum* canis normally determine tegumentar lesions in the dogs but the cats can be healthy carriers or present small lesions.[11] The inter-human transmission of the *Microsporum canis* is extremely rare.[8]

Clinically, according to the length of the hair, tinea of the scalp can be classified into:

a) Microsporic tonsuring;
b) Trichophyton type tonsuring;
c) *Kerion Celsi* type;
d) Tinea favosa.[12,13]

The direct mycology of the hair shows the type of parasitism of the fungus: ectothrix, endothrix or mixed. The culture in Sabouraud medium with Actidione permits the macroscopic and microscopic characterization of the genus and species of the infecting fungi of the hair.[12,13]

The therapy of scalp tinea must be done with systemic anti-fungicides such as Griseofulvin, Cetoconazole, Itraconazole, Fluconazole, Terbinafine, and associated topical anti-fungal shampoos of selenium sulfate 2,5%, or Ketoconazole, Imidazoles (Clotrimazole, Econazole, Miconazole, etc.), Allylamines and Ciclopirox olamine.[12]

CASE REPORTS

15 children from a public day care center of the district of Jesus de Nazareth were sent to the district health center, being that 11 cases had scalp lesions and four on the skin. The day care center is situated on a Hill, the population of which presents low socio-economical conditions.

Eleven children were aged between two and six year and three months ago presented scalp lesions, scaly tonsuring area type; nine patients (81.8%) with large and single areas and two (18.2%) had minor and more diffuse lesions, diagnosed as microsporic tonsuring scalp tinea (Figures 1 e 2). The other four patients presented ring-like lesions with Erythematosus, vesi-crustaceous borders located on the arm and thorax on three of them and on the glabrous skin of one, diagnosed as body tinea.

Of the 11 patients with scalp lesions, eight (61%) were of female sex and all black or pardo.

The frequency of the location of the scalp lesions varied, four cases (36.4%) being in the frontal region, three (27.3%) in the occipital, two (18.2%) on the parietal and two (18.2%) diffuse throughout the scalp.

The direct mycological examination showed parasitism of the Ectothrix type in the hair of the 11 patients (Figure 3), and five patients in the cultures of Sabouraud medium with Actidione (45.5%) the growth of a flat, reverse filamental colony of white coloration and reverse of yellow-gold, was observed, characteristics of *Microsporum canis* (Figure 4). The

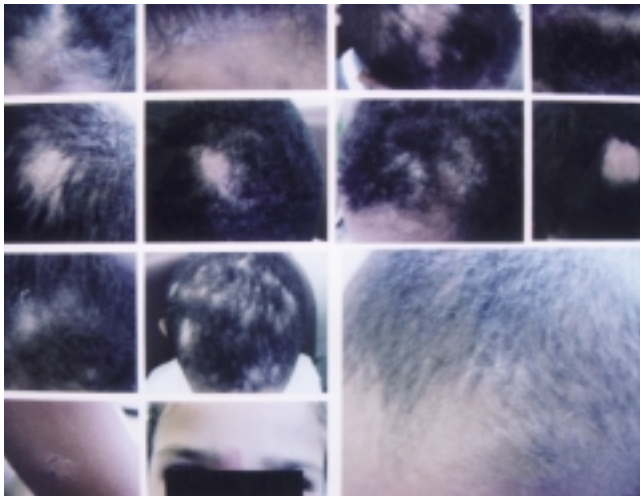

FIGURE 1: Demonstration of the scalp lesions of 11 children with tonsuring tinea and two children with tinea of the body

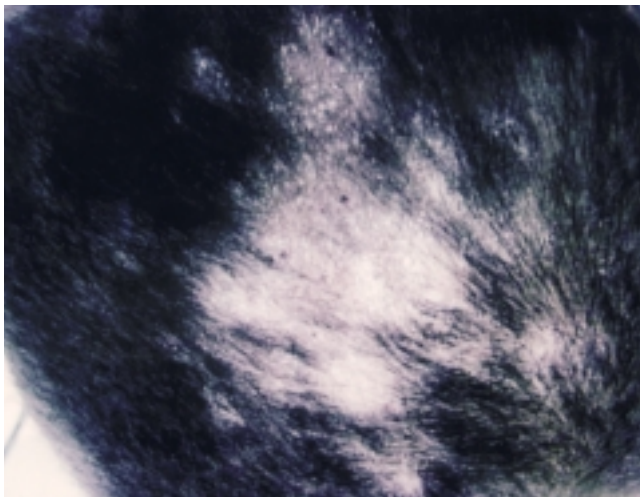

FIGURE 2: Case 5 -Microsporic tonsuring area in the scalp

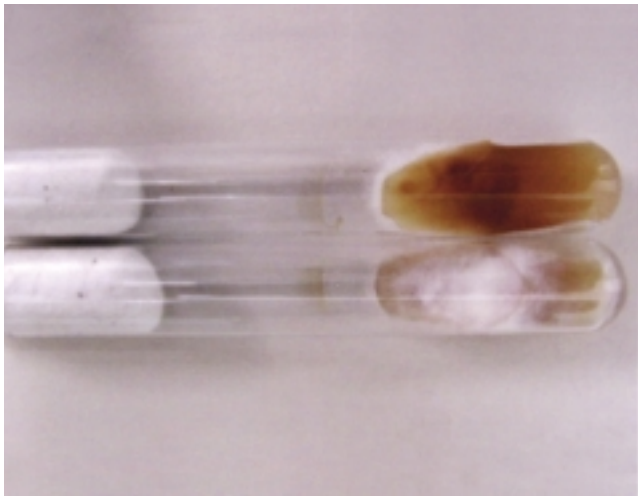

FIGURE 4: Case 2 - Culture in modified Sabouraud medium -filamental colony, flat, reverse yellow-gold

cultures of the other six patients were negative. The micro-morphology of the colonies revealed the presence of hyaline filaments, divided, ramifying and macro-conidia fusiforms, with pointed ends, thick walls, spiny, with more than six internal cells (Figure 5). The direct examination of the scales of the patients with body tinea revealed filaments of dematophytes and there was growth of *Microsporum canis* in three cases and in one of them the culture was negative.

Chart 1 shows in details the clinical characteristics and the results of the examinations of all the patients.

The day care center did not have sand but there was reference to games amongst the children of the day care center and loose dogs on the streets of the district.

The 11 children with scalp tinea were medicated with Griseofulvine in the dosage of 15mg/kg/day and Isoconazol topical solution at night during 45 days, with complete regression of the lesions at the end of the treatment. The patients with body tinea used Isoconazol cream twice per day during 30 days and evolved to total cure of the skin lesions.

DISCUSSION

Micro-epidemics are defined as epidemic outbreaks in a restricted social context where more than one case of the disease in question is registered.[8] The presence of 11 cases of scalp tinea in children frequenting the same day care center therefore characterized a micro-epidemic.

The infected children were between two and

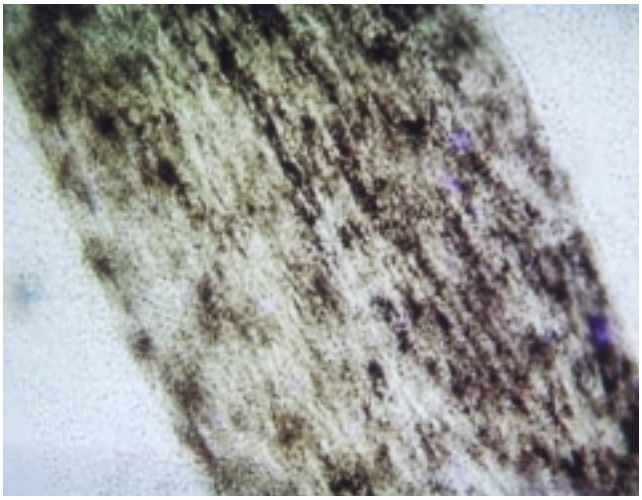

FIGURE 3: Case 4 - Direct Mycology of hair with Ectothrix

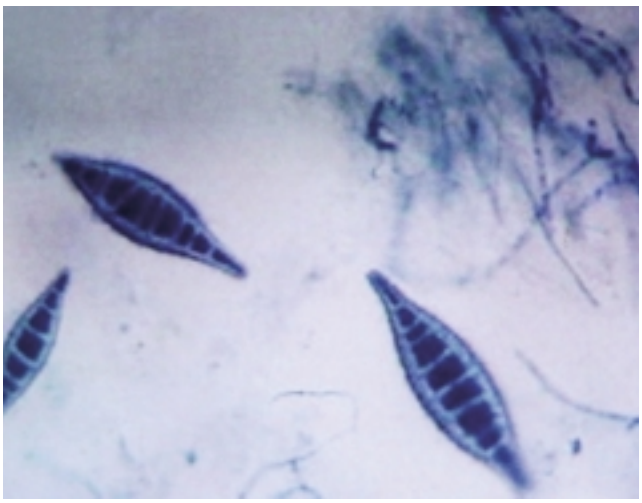

FIGURE 5: Case 2 - Micro-morphology of the colony- macroconideum of *Microsporum canis*

CHART 1: Distribution of the patients in the variables of age, sex, race, location of the lesions, results of the direct mycological examinations and cultures for fungi

Patient n°	Age (years)	Sex	Skin color	Location of the lesions	Direct Mycology	Culture for fungi
1	6	F	B	Occipital and frontal Regions	Ectothrix	*M. canis*
2	4	M	B	Right parietal Region	Ectothrix	*M. canis*
3	5	M	B	Frontal Region	Ectothrix	Negative
4	2	M	PD	Occipital Region	Ectothrix	Negative
5	5	M	PD	Occipital Region	Ectothrix	*M. canis*
6	5	M	B	Left parietal Region	Ectothrix	Negative
7	4	M	B	Frontal Region	Ectothrix	Negative
8	5	M	B	Frontal Region	Ectothrix	*M. canis*
9	3	F	PD	Frontal Region	Ectothrix	Negative
10	5	M	PD	Diffuse in the scalp	Ectothrix	*M. canis*
11	3	F	PD	Occipital Region	Ectothrix	Negative
12	4	F	PD	Right arm	Filaments of dermatophytes	Negative
13	5	F	PD	Glabrous skin	Filaments of dermatophytes	*M. canis*
14	22	F	PD	Thorax	Filaments of dermatophytes	*M. canis*
15	5	F	PD	Thorax	Filaments of dermatophytes	*M. canis*

* Sex: F (female), M (male); Skin color: B (black) and PD (pardo); *M. canis* (*Microsporum canis*).

six year of age, that is, in the pre-school range, and they presented histories of games with stray dogs in the district, confirming the data of some authors as to the preference for this age range and the contact with animals.[6,9,11,14] Brilhante and collaborators refer that contact with domestic animals and games in the sand have little importance in the origin of scalp tinea,[4] believing that the predilection for children occurs due to the greater exposure to risk factors such as precarious hygienic habits and agglomerations in day care centers and colleges.[3,4]

Dogs and cats constitute the principal reservoirs and sources of infection of the *Microsporum canis*, being that the former present skin lesions and the cats diminutive lesions or they are asymptomatic, representing difficulty in the epidemiological control.[11,14] The human infections by zoophilic dermatophytes happen sporadically since these fungi have a low frequency in the environment and are dependent on contact with infected animals.[8] The possibility of inter-human transmission of the *Microsporum canis* is rare,[9] however there is this

possibility, and it probably occurred between the children of the day care center seeing that the parents denied contact of them with animals.

The male sex was more affected than the female, corroborating some works that show predilection of the scalp tinea for this sex.[2,6,9,14]

The mechanism of penetration of the dermatophyte in the hair can be explained in the following way: after contact with the scalp of a susceptible individual, the arthrospores form filaments that proliferate until the formation of a mass of filaments in the opening of the hair follicles, which will grow in the direction of the capillary bulb between its external and internal borders. Around the tenth day the filament penetrates the follicle in its medium portion, developing only in the anagenous hairs in a balanced way with the velocity of keratinization of them, thus preventing its elimination.[10]

The direct mycological examination is fundamental to confirm the suspicious diagnosis of scalp tinea, setting aside the differential diagnoses and favoring therapeutic conduct. The discrepancy between the positive results of the direct examinations of the 11 cases under study (100%) and the cultures for positive fungi in only five of them (45.5%) is admitted, considering the irregular distribution of the fungi in the lesions, the presence of dead or scarce fungal elements, previous treatment of fungi more demanding for development *in vitro*.[3-5] Some children had been submitted to previous treatment with oral Cetoconazole, topical anti-fungicides and household medications, which possibly prejudiced the growth of the fungi in the culture medium.

Trichophyton tonsurans is more prevalent in the United States of America, Caribbean, Central America, Australia and Brazil (North and Northeast regions, Federal District and Paraná). The substitution of the *Microsporum canis*, previously principal etiological agent of *tinea capitis*, by *Trichophyton tonsurans* in some regions correlates to the changes of social habits, urbanization, the climate, human movement and social-economical aspects such as leisure in clubs, swimming pools and saunas, etc. This fact is worrying given that this agent is anthropophilic and therefore adapted to man and can reach greater relevance from the epidemiological point of view.[3]

Griseofulvin in the dosage of 15 to 20mg/kg/day during 45 to 90 days has been the therapy of choice for the treatment of scalp tinea due to its efficacy and good tolerance, especially in children, low cost and rare side effects.[15]

Apart from the medicament treatment, the interruption of the transmission chain must be dealt with, that is, to etiologically diagnose the dermatophytes allowing the general measures of control treatment of the human and animal cases, examination of the parents for research of asymptomatic carriers principally in the cases of infection by *Trichophyton tonsurans*, cleaning of the environment, hair brushes, combs and caps.[12]

The scalp tinea of the 11 children and the four patients that presented them on the body were only eliminated after the identification of the etiological agent, treatment of all those infected, orientation as to the care of animals and use of Ketoconazole based shampoos on the possible asymptomatic persons, that is, on the other children of the day care center.

It is also important to remember that the dermatophytes, especially of the scalp, are not diseases of obligatory notification, prejudicing the control and intervention in the risk factors. ❑

REFERENCES

1. Lacaz CS, Porto E, Heins Vaccari EM, Melo NT. Guia para identificação: Fungos, Actinomicetos, Algas de interesse médico. São Paulo: Sarvier; 1998. p.278 - 81.
2. Furtado MSS, Ihara LT, Marója MF. Tinea capitis na cidade de Manaus - AM. An Bras Dermatol. 1985; 60: 315-8.
3. Oliveira ACP, 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.
4. Brilhante RSN, Paixão GC, Salvino LK, 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.
5. Lima EO, Pontes ZBVS, Oliveira NMC, Carvalho MFFP, Guerra MFL, Santos JP. Freqüência de dermatofitoses em João Pessoa - Paraíba - Brasil. An Bras Dermatol. 1999; 74: 127-32.
6. Costa M, Passos XS, Souza LKH, Miranda ATB, Lemos JÁ, Oliveira Júnior JG, Silva MRR. Epidemiologia e etiologia das dermatofitoses em Goiânia, GO, Brasil. Rev Soc Bras Med Trop. 2002; 35: 19-22.
7. Jahangir M, Hussain I, Khurshid K, Haroon TS. A clinic-etiologic correlation in tinea capitis. Int J Dermatol. 1999; 38: 275-8.
8. Pinheiro AQ, Moreira JLB, Sidrim JJC. Dermatofitoses no meio urbano e a coexistência do homem com cães e gatos. Rev Soc Bras Med Trop. 1997; 30: 287-94.
9. Severo LC, Gutierrez MJ. Tinha do couro cabeludo por Microsporum canis em adulto. An Bras Dermatol. 1985; 60: 87-8.
10. Cestari TF, Abdalla C, Assis TL. Fisiopatogenia das dermatofitoses. An Bras Dermatol.1990; 65: 310-6.
11. Bassanesi MC, Conci LA, Souza AP, Severo LC. Fonte de infecção na dermatofitose por Microsporum canis. An Bras Dermatol. 1993; 68(1): 11-3.
12. Guidelines of care for superficial mycotic infections of the skin: Tinea capitis and tinea barbae. J Am Acad Dermatol. 1996; 34: 290-4.
13. Zaitz C, Campbell I, Marques AS, Ruiz LR, Souza VM. Compêndio de micologia médica. Rio de Janeiro: Medsi; 1998. p. 81-8.
14. Maraki S, Tselentis Y. Survey on the epidemiology of Microsporum canis infections in Crete, Greece over a 5-year period. Int J Dermatol. 2000; 39: 21-4.
15. Develoux M. Griseofulvin. Ann Dermatol Venereol. 2001; 128: 1317-25.

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