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Dermoscopy in *tinea capitis*: a prospective study on 43 patients

Dermatoscopia en tiña de la cabeza: un estudio prospectivo en 43 pacientes

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ABSTRACT

Introduction: For *tinea capitis*, «comma hairs» and «corkscrew hairs» have been described as dermoscopic patterns by some authors; others have reported small groups of patients diagnosed with *tinea capitis* with positive dermoscopy; however, there is no data about the sensitivity of dermoscopy in the diagnosis of *tinea capitis*. We sought to report the results of dermoscopy in a large group of patients with *tinea capitis* in order to establish the specificity of dermoscopic examination. **Material and methods:** Forty three patients with *tinea capitis* were evaluated clinically and with dermoscopy during a 2 months period in 2011. Direct examination with potassium hydroxide and culture was performed to all patients. **Results:** Direct examination with potassium hydroxide was positive in all cases and 17 had culture positive for *Trichophyton tonsurans*, *Microsporum canis* or *Microsporum audouinii*. Thirty one patients had positive dermoscopy. «Comma hairs» were found in the seven patients in whom *Microsporum canis* or *Microsporum audouinii* were confirmed by culture and in six of the 10 patients in whom *Trichophyton tonsurans* was isolated. «Corkscrew hairs» were found in three patients with *Microsporum canis* or *Microsporum audouinii* and in three patients with *Trichophyton tonsurans* infection. **Comment:** «Comma hairs» are not specific for *Microsporum* or *Trichophyton* and «corkscrew hairs» are not specific for *Trichophyton soudanense*, they can be found in other species of *Trichophyton* and *Microsporum*. A limitation in our study is the lack of positive cultures in a considerable percentage of potassium hydroxide (KOH) direct examination positive patients. Further studies are needed.

RESUMEN

Introducción: Se han descrito los «pelos en coma» y «en sacacorcho» como patrones dermatoscópicos de tiña de la cabeza. Otros autores han reportado pequeños grupos de pacientes con diagnóstico de tiña de la cabeza y dermatoscopia positiva; sin embargo, no hay datos sobre la sensibilidad de la dermatoscopia en el diagnóstico de esta patología. En este estudio se reportan los hallazgos dermatoscópicos de un grupo grande de pacientes con tiña de la cabeza a fin de establecer la especificidad de la exploración dermatoscópica. **Material y métodos:** Fueron evaluados clínicamente y dermatoscópicamente 43 pacientes con diagnóstico de tiña de la cabeza durante un periodo de 2 meses en 2011. A todos se les efectuó examen directo con hidróxido de potasio (KOH) y cultivo micológico. **Resultados:** El examen directo fue positivo en todos los casos y 17 cultivos resultaron positivos para *Trichophyton tonsurans*, *Microsporum canis* y *Microsporum audouinii*. Treinta y un pacientes presentaron dermatoscopia positiva. Se hallaron «pelos en coma» en los siete pacientes en quienes se aisló *Microsporum canis* o *Microsporum audouinii* y en seis de los 10 pacientes en los que se aisló *Trichophyton tonsurans*. Se encontraron «pelos en sacacorcho» en tres pacientes con *Microsporum canis* o *Microsporum audouinii* y en tres pacientes con infección por *Trichophyton tonsurans*. **Comentario:** Los «pelos en forma de coma» no son específicos para *Microsporum* o *Trichophyton* y los «pelos en sacacorcho» no son específicos para *Trichophyton soudanense*. Una limitación de nuestro estudio es la falta de cultivos positivos en un porcentaje considerable de pacientes con examen directo con hidróxido de potasio (KOH) positivo. Se necesitan más estudios en el futuro.

Tinea capitis is an infection of the scalp caused by dermatophytes of the genera *Trichophyton* and *Microsporum*.^{1,2} In the United States, *T. tonsurans* is the predominant causative organism of *tinea capitis* (98%). *M. canis* is the most common causative agent in Central and Southern Europe, followed by *Trichophyton tonsurans*, which represents 50-90% of dermatophyte scalp isolates in the UK, and *T. violaceum*, which is the most com-

mon in Greece and Belgium, with significant increases in recent years.³

In the Dominican Republic, recent studies showed that the most frequent causative agents are *T. tonsurans* in rural areas and *M. audouinii* and *M. canis* in urban environments.^{4,5} Boys between 6 and 8 years old are more affected than girls,^{4,6} and the most frequent clinical presentations are either the non-inflammatory forms,⁵ characterized –depending

on the causative agent— by one or multiple patches of alopecia with diffuse scaling, or the «black dot» variety, which consists of areas of alopecia with small black dots that represent hair broken at the follicular orifice.

Diagnosis can be confirmed by several laboratory methods. Some dermatophytes, such as *M. audouinii* and *M. canis*, can be diagnosed with a Wood's ultraviolet light because they will produce a characteristic fluorescence. Unfortunately, *T. tonsurans* does not fluoresce, so this tool is not helpful.⁷ A potassium hydroxide preparation used on hair from an involved area is diagnostic and a fungal culture in Sabouraud dextrose agar or MycoGel[®] agar allows identification of the responsible organism in most cases. Samples for culture can be obtained by scraping with a scalpel or, more easily, with a moistened cotton swab or cytobrush.⁸

Exploration can also be performed using the dermoscope.⁹ Dermoscopy is a noninvasive technique allowing rapid and magnified in vivo observation of the skin with the visualization of morphologic features often imperceptible to the naked eye. It can be performed with manual devices which do not require any computer «assistance», usually x10 magnifications are employed.¹⁰

The dermoscopic features of *tinea capitis* were first reported by Slowinska et al. in 2008, who described «comma hairs» as a characteristic finding. These are short comma-shaped hairs resulting from cracking and bending of a hair shaft filled with the hyphae.^{11,12}

Hughes et al. recently confirmed that dermoscopy is a fast, noninvasive and reliable tool in the screening of children with endothrix *tinea capitis*.¹³ They identified another dermoscopic pattern of *tinea capitis* in a black population: «corkscrew hairs», described as hairs that showed a more exaggerated corkscrew or coiled appearance than comma hairs. Corkscrew hairs have been reported as a dermoscopic marker for endothrix *tinea capitis*.¹⁴

Other authors reported small groups of patients diagnosed with *tinea capitis* with positive dermoscopy.¹² However, there is no data about the sensitivity of dermoscopy in the diagnosis of *tinea capitis*. The purpose of this study is to report the results of dermoscopy in a group of patients with *tinea capitis* who were consecutively evaluated in a two-month period during a *tinea capitis* outbreak in the Dominican Republic, in order to establish the specificity of dermoscopic examination.

METHODS

This prospective study was performed at the Instituto Dermatológico de Santo Domingo—in the Dominican Re-

public— between the months of June and July, 2011 when a *tinea capitis* outbreak occurred. Forty-three consecutive patients referred to the hospital for possible *tinea capitis* underwent clinical evaluation, mycological study (KOH and cultures) and dermoscopic examination.

We used a handheld dermoscope (DermLite[®] II hybrid m, San Juan Capistrano, CA) to examine the affected areas of the scalp and images were captured through the dermoscope with a digital camera (Sony CyberShot[®] DSC-P200, Sony; Tokyo, Japan).

RESULTS

Forty-three patients (aged between one and 27 years old) were included in the study, one male adult, 29 boys and 13 girls. All of them were natives and residents of the Dominican Republic, with Fitzpatrick's phototypes III-VI. The duration of the scalp lesions ranged from one week to four months, and only three patients had lesions for more than one year.

Thirty-nine patients had scaly scalp and patchy alopecia, and four had inflammatory and crusty lesions. Clinically, 26 patients had clinical features suggestive of microsporic infection (one or two big patches surrounded by several small patches), and 17 patients of trichophytic infection (from 10 to 30 small patches).

KOH examination was positive in all cases, showing ectoendothrix parasitization in 18 cases, endothrix parasitization in 18 cases, and only filaments in seven. Cultures were positive in 17 patients, including *Tricophyton tonsurans* (10 patients), *Microsporum canis* (four patients) and *Microsporum audouinii* (three patients).

Thirty-one patients had positive dermoscopy; 30 patients had comma hairs alone or in association with corkscrew hairs, and one patient had corkscrew without comma hairs (Figure 1). «Comma hairs» were found in all the seven patients in whom *M. canis* or *M. audouinii* were confirmed by culture and in six of the 10 patients in whom *Tricophyton tonsurans* was isolated by culture. «Corkscrew hairs» were found in 12 cases. These include three patients with *M. canis* or *M. audouinii* infection and three patients with *Tricophyton tonsurans* infection (Figures 2, 3 and 4). Only one of the four patients with kerion had positive dermoscopy. This patient had culture positive for *T. tonsurans*; he presented comma and corkscrew hairs and white sheaths around the hair shaft. In the other three patients with kerion, dermoscopy showed only crusts.

Other dermoscopic findings detected in our cases included «white sheaths» around the proximal hair shaft, found in 17 patients; «banded hairs», found in nine, and

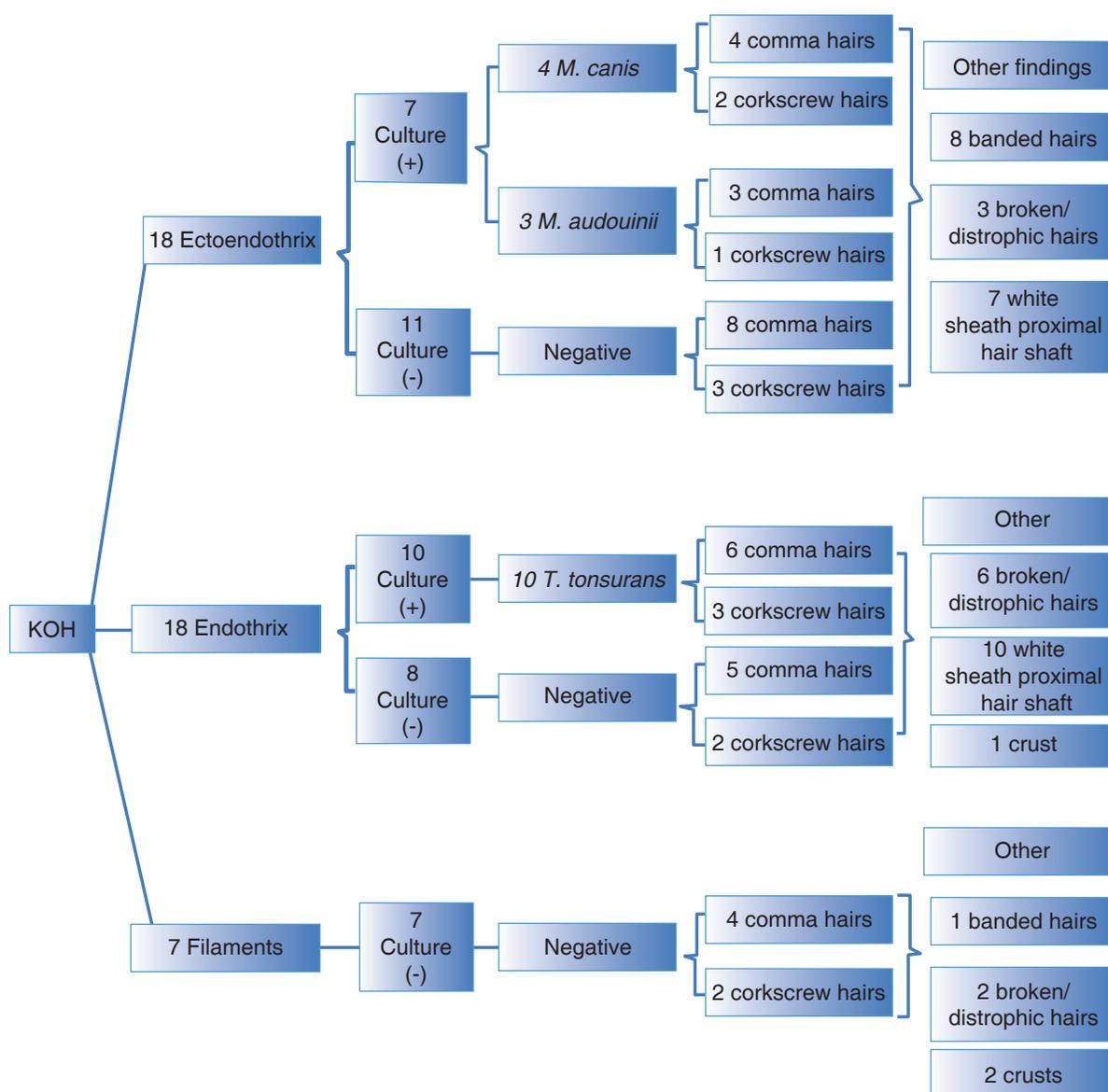


Figure 1. Mycological and dermoscopic findings in 43 patients with tinea capitis.

«broken and dystrophic hairs», in 11. We also found translucent hairs in two patients.

COMMENT

Our prospective study detected comma and/or corkscrew hairs in 31 of 43 consecutive patients with tinea capitis, which constitutes 72%. In our experience, these dermoscopic markers are very characteristic but not found in all patients. It is important, however, to note that three of the

13 patients with no comma or corkscrew hairs had inflammatory tinea capitis, and that five had shaved haircuts, which makes detection of comma or corkscrew hairs impossible.

Slowinska et al.¹¹, Crocker et al.¹² and Hughes et al.¹⁴ reported small series of patients with tinea capitis and positive dermoscopy but did not provide information about the prevalence of positive dermoscopy findings among patients with tinea capitis. This is the first study that has prospectively included a large series of patients in order to establish the specificity of the dermoscopic examination.

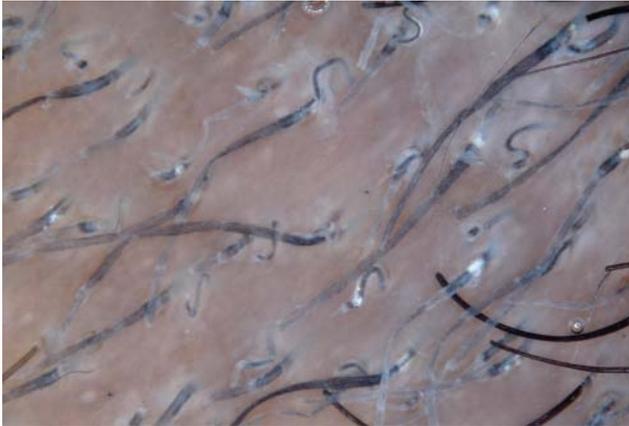


Figure 2. *M. audouinii* tinea capitis showing comma and corkscrew hairs, white sheaths around proximal hair shafts and translucent hairs.



Figure 3. *M. canis* tinea capitis showing comma and corkscrew hairs, white sheaths around proximal hair shafts, broken and banded hairs.

We found comma hairs in all patients where *Microsporum* was the confirmed causative agent and in more than half of the patients in whom *Trichophyton* was confirmed by culture. Comma hairs, then, are not specific for any of these agents.

Corkscrew hairs were first described by Hughes et al.¹⁴ in black patients with *T. soudanense*. We found corkscrew hairs in three patients with *T. tonsurans* infection, in two patients with *M. canis* infection and in one patient with *M. audouinii* infection; all patients with corkscrew hairs had Fitzpatrick skin types IV to IV.



Figure 4. *T. tonsurans* tinea capitis showing comma and corkscrew hairs.

Based on these results, we conclude that corkscrew hairs are not specific to *T. soudanense*, they can be found in other species of *Trichophyton* and *Microsporum*, and probably are a variation of comma-shaped hairs in black populations.

Our study also reports new dermoscopic findings, the most common was the presence of white sheaths around the proximal shafts; this feature was detected both in cases of endothrix and ectothrix parasitization.

Our study confirms that dermoscopy is a useful diagnostic and confirmatory method for non-inflammatory *tinea capitis*, but it should be noted that negative dermoscopy is observed in up to 30% of the cases, including 75% of the cases of inflammatory *tinea* or kerion, where dermoscopy only shows crusts. A limitation of our study is the lack of positive cultures in a considerable percentage of KOH-positive patients. Direct examination with KOH is, however, a gold standard to diagnose *tinea capitis* as it is an easy and non-expensive tool, even though it requires some technical education and a microscope. Cultures cannot always be performed and sometimes, as in our cases, bacterial colonization has an important role in negative fungal isolation.

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