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CLINICAL CASE

Trichomycosis (trichobacteriosis) capitis in an infant. Microbiological, dermoscopic and ultrastructural features

Tricomicosis (tricobacteriosis) en un infante. Aspectos microbiológicos, dermatoscópicos y ultraestructurales

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Abstract

Introduction: Trichomycosis is a superficial infection caused by *Corynebacterium flavescens*, which regularly affects axillary, and to a lesser extent, pubic, scrotal and intergluteal, and exceptionally, head hairs or trichomycosis capitis (TC). This condition is characterized by the formation of bacterial nodules. Clinically, it can be confused with white stone or pediculosis. The diagnosis is made by microscopic and dermoscopic observation, and confirmed by culture. **Objective:** To present a case of TC in an infant, with emphasis in the microscopic, dermoscopic, and ultrastructural characteristics. **Clinical case:** A 6 month-old boy, otherwise healthy, with multiple yellowish concretions on the hairs of the head. TC was confirmed by yellow fluorescence with Wood's light; white-yellowish beads, like ``rosaries of crystalline stones'' were observed on dermoscopy, direct examination showed bacterial masses, and *Corynebacterium flavescens* was identified by culture. A superficial infection, without perforation of the hairs, was confirmed by electron microscopy. Treatment with fusidic acid for 3 weeks achieved a clinical and microbiological improvement. **Conclusion:** TC is a rare condition that affects children, and tends to be mistaken with other diseases of the hair, such as pediculosis and mycotic infections.

Keywords:
Trichomycosis;
Trichobacteriosis;
Capitis;
Corynebacterium flavescens;
Fusidic acid;
Dermoscopy

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Introduction

Trichomycosis or trichobacteriosis is a rare asymptomatic superficial infection caused by a bacteria named *Corynebacterium flavescens* (also *Corynebacterium tenuis*)[1-3] which occurs mainly in the axillary hairs and less frequently in the pubic, scrotal and intergluteal hair. It is characterized by the formation of nodules or bacterial masses (concretions) that grow around the hair shaft.

Clinically it can be manifested in 3 forms: yellow or flava, which is observed in 95-98% of cases and, exceptionally, red (rubra) and black (nigra) varieties. It is initiated by the increase of bacteria, which can be part of the usual flora. These are adhered to the surface or cuticle of the hair by means of a cementitious substance, the chemical composition of which is still unknown. Electron microscopy studies have shown that the microorganism is extrafollicular, it namely affects the cuticle and does not penetrate the cortex or marrow of the hair. It is only strongly adhered to its surface and, therefore, develops slowly to form concretions, pods or nodules around the hair shaft.

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Trichomycosis is produced by an aerobic actinomycete called *Corynebacterium flavescens*, which has also been called *C. tenuis* for many years, but this name is not classified in the Bergey Manual[8]. It is a Gram positive bacterium, composed of bacilli and diphtheria forms, belonging to the so-called group 2 (LD2), also called CDC-G/LD group and is related to the yellow clinical variety or flava[2,9]. This microorganism has not been isolated from nature but only of infected human hairs. In some studies of habitual flora until 30% has been isolated[10]. The disease is characteristic of humid and tropical climates[2,3,6]. It is presented particularly as a disease affecting adolescents and young adults. There is no preference of race and gender, although in our environment we observe more male patients, because women have the habit of shaving axillary hair. Man-to-man transmission has been reported, especially in overcrowded groups such as soldiers, sportsmen and homosexual groups[2,11-14]. The presentation of trichomycosis capitis is exceptional, and it is observed more in children.

The aim of the manuscript is to communicate a case of trichomycosis capitis in an infant and present its clinical, microbiological, ultrastructural and therapeutic characteristics.

Clinical case

A 6-month-old healthy child with dermatosis located on the head that affected the left occipital region and the hairs, consisting of multiple hairy nodules of yellow color, according to the description of the mother, with a "sandstone appearance", with a hard sensation, and of a month and a half of asymptomatic evolution. The patient had no extracutaneous involvement. Background of importance: the only child of a single mother, with excessive care, daily bath and constant and longtime use of wool caps. Presumptive clinical diagnosis: white stone (figure 1).

Microbiological study

Wood was subjected to light, which showed yellow fluorescence, with delimited hair nodules. Dermoscopy showed concretions or white-yellowish, crystalline chains, with the appearance of a "rosary of crystalline stones". In the direct examination with KOH (10%) there were hair nodules formed by bacterial masses. To the culture in chocolate agar medium, white-yellowish creamy colonies were obtained, which microscopically formed gram positive bacilli, with some coryniforms. The biochemical identification was made by the Vytec-2® automated system and corresponded to *Corynebacterium flavescens*. With parasitized hairs, scanning electron microscopy was performed. For this study a scanning electron microscope Jeol®, model JSM-5300 was used, which demonstrated the presence of bacterial concretions, only adhered to the hair shaft and without perforation (figure 2). Based on the previous studies we had a diagnosis of trichomycosis capitis.

Fusidic acid treatment was indicated, 2 applications per day for 3 weeks, without zone shaving. The patient presented clinical and microbiological cure and was re-evaluated after 2 months without any hairy parasites.

Discussion

The trichomycosis that affects hairs on the head is exceptional. Levit proposed a pathogenic hypothesis about axillary, inguinal, and intergluteal hair disease years ago, suggesting that an insoluble adhesive substance is needed for the bacteria to stick to the hair

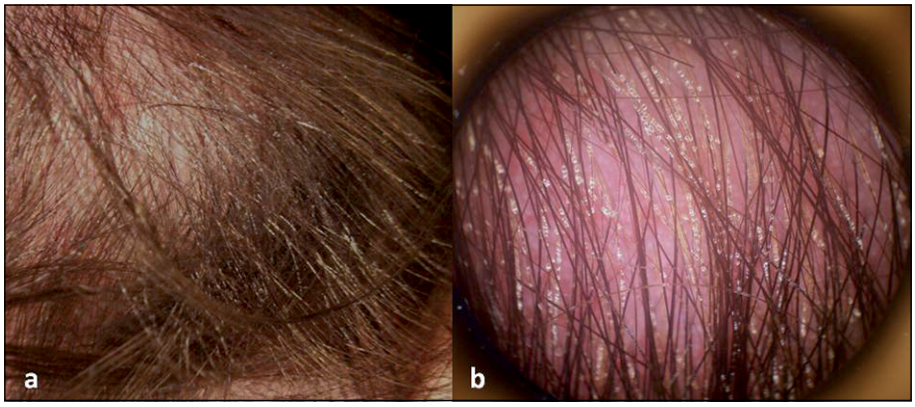

Figure 1. a) Direct examination of trichomycosis capitis; **b)** Dermoscopy. White hair concretions, similar to "crystalline" nodules around the hair shaft.

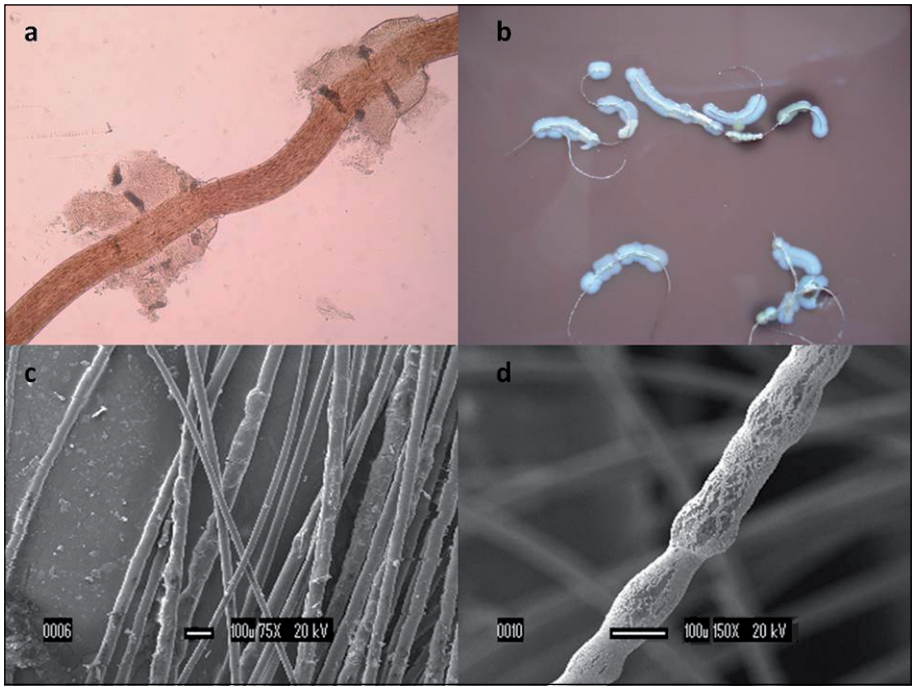

Figure 2. a) Direct examination of concretions or nodules around the hair. (SSI, 40X); **b)** Culture of Corynebacterium flavescens in chocolate agar; **c)** Adherence of bacteria is observed in most hairs, some show greater damage than others since the lesion widens the hair. (Calibration bar measures 100 mm, 75X); **d)** Bacteria adhered throughout the hair forming concretions. (Calibration bar measures 100 mm, 150X).

shaft, which may not only be produced by the microorganism, but synthesized by apocrine glands in association with bacteria[15]. This hypothesis has not been proven, and some authors simply consider that the axillary location is more exposed to bacteria, and that humidity and poor hygiene are more important for the disease to develop. However, and related to our case, the child did not present this condition, only an excess of moisture by the constant use of caps[16].

The preferred clinical topography is the axillary. In a recent report of 56 cases, 92% were axillary and the remainder corresponded to pubic, intergluteal affection and an exceptional case of eyelashes, but associated with axillary trichomosis[10]. In recent years, some cases of trichomycosis capitis have been reported, all in children, and this makes a difference with the hypothesis of apocrine glands and notes that they can occur in other locations[16-19]. For example, Silva et al. present the case in an infant of one year of age, with no apparent factor[16], de-Almeida et al. report the case of a child with neurological sequela and who was constantly lying down [17] and Luna-Hernández et al. report of another child who has a constant state of sweating[18]. If we compare these 3 cases with ours, which was that of an overprotected child who spent great periods with a cap, which generated great sweating[16-18], it seems to be more important for the disease to establish excess sweat, humidity and poor hygiene[19].

As for the differential diagnosis, particularly in the head location, trichomycosis should be distinguished from white stone (*Trichoporon* spp.), pediculosis (nits), monilethrix, trichorrexis nodosa and cylindrosis[10,20].

The diagnosis of trichomycosis must be clinical, and Wood's light support is strong, because parasitized hairs give a yellow luminescence. This is particularly useful for determining extent in cases involving several hairy areas of the body[10]. With the new dermoscopy tool, it is important to describe that hair nodules are seen as transparent crystalline "rosaries of crystalline stones" and distinguish it from other aforementioned conditions[16]. With the support of scanning electron microscopy, the bacterial masses can be clearly observed, which are limited only around the hair and never pierce it, ie it is a strong bacterial adhesion[7,16,21,22].

In general, cultures are easily obtained, provided that they are planted in rich culture media (blood agar, BHI), micro-organisms are observed to be bifurcated coryniforms (such as "drum sticks") and their biochemical identification generally corresponds to *C. flavescens*[2,10]. Recently another species, identified by molecular biology and called *Corynebacterium propinquum*, has been reported, indicating that there are likely to be other agents capable of causing this infection[11].

Many authors suggest that the shaving of the affected area is useful, but this helps more in the axillary zone where the humidity is constant and there are more recurrences. There are a number of reported topical treatments, such as the use of 3% sulfur (in glycerin), 2% sodium hypochlorite, 5% benzoyl peroxide (gel), naftifine, erythromycin and clindamycin[2,4,10,23,24]. In our experience, in axillary cases the best response is obtained with a constant shaving and daily application of 2% fusidic acid in cream[10]. For CT cases, it is not necessary to shave, it is only important to control sweating and the application of a topical antibacterial.

Conclusion

CT in infants and children is an exceptional entity, presented as an association with excessive sweating and poor cleaning. It is a superficial bacterial infection, which forms bacterial concretions or masses, which are easily confused with pediculosis and other mycotic infections. The diagnosis is confirmed by dermoscopy and microscopic observation, confirmed by culture, and the treatment is based on topical antibacterials.

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

Rights to privacy and informed consent: The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

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Conflicts of Interest

Authors state that any conflict of interest exists regards the present study.

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