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Journal

Dermatology Online Journal, 22(3)

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Publication Date

2016

DOI

10.5070/D3223030362

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Peer reviewed

Case report

Tinea capitis in adults

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Dermatology Online Journal 22 (3): 4

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Abstract

Background: Tinea capitis is caused by dermatophyte fungi that utilize keratin as a nutrient source. Scalp erythema, scaling, and crusting are typical signs of this disease. Although most commonly seen in prepubescent children, tinea capitis can occur in adults.

Results: Endothrix tinea capitis owing to *Trichophyton tonsurans* commonly produces generalized scaling and localized perifollicular inflammation reminiscent of lichen planopilaris. Ectothrix tinea capitis owing to *Microsporum sp.* produces well-demarcated erythematous plaques suggestive of psoriasis. H&E stained biopsy specimens, KOH preparations or fungal cultures will confirm the diagnosis.

Conclusion: Because of a low index of suspicion for tinea capitis in adults with scaling and alopecia, diagnosis and appropriate treatment are often delayed. Resistance to treatment for seborrheic dermatitis or psoriasis should prompt a KOH, fungal culture or biopsy to confirm the diagnosis of tinea capitis and initiate systemic antifungal agents.

Keywords: Tinea capitis, dermatophyte, *Trichophyton tonsurans*, *Microsporum sp.*, psoriasis, ectothrix, endothrix, fungal culture

Introduction

In the United States, tinea capitis most commonly occurs in female children (59% girls, 41% boys) and 95% of patients are infected with *Trichophyton tonsurans* [1,2]. Children present with pruritus, scaling, “black dots”, hair loss, and posterior cervical lymphadenopathy. Tinea in adults is often more subtle and its cause is not well understood since it is believed that sebum in

adults has protective effects that decrease the risk of infection. It has been postulated that tinea capitis in post-menopausal women may be related to hormonal imbalances that alter the protective effects of sebum [3].

Case synopsis

Case 1

A 79-year-old woman presented with a 6 month history of itching, scaling and hair loss that had failed to respond to ketoconazole shampoo, zinc pyrithione shampoo, clobetasol solution, and fluocinonide solution. Physical examination revealed several 3-4 cm patches of scaling, perifollicular erythema, and follicular plugging (Figure 1). A 4 mm punch biopsy was obtained and hematoxylin and eosin staining demonstrated the typical large spore, endothrix fungus (Figure 2). A fungal culture grew *Trichophyton tonsurans*. The patient was treated with terbinafine 250mg daily with complete clearing in 3 weeks. No grandchildren with scalp scaling, itching, or hair loss were present in the household.

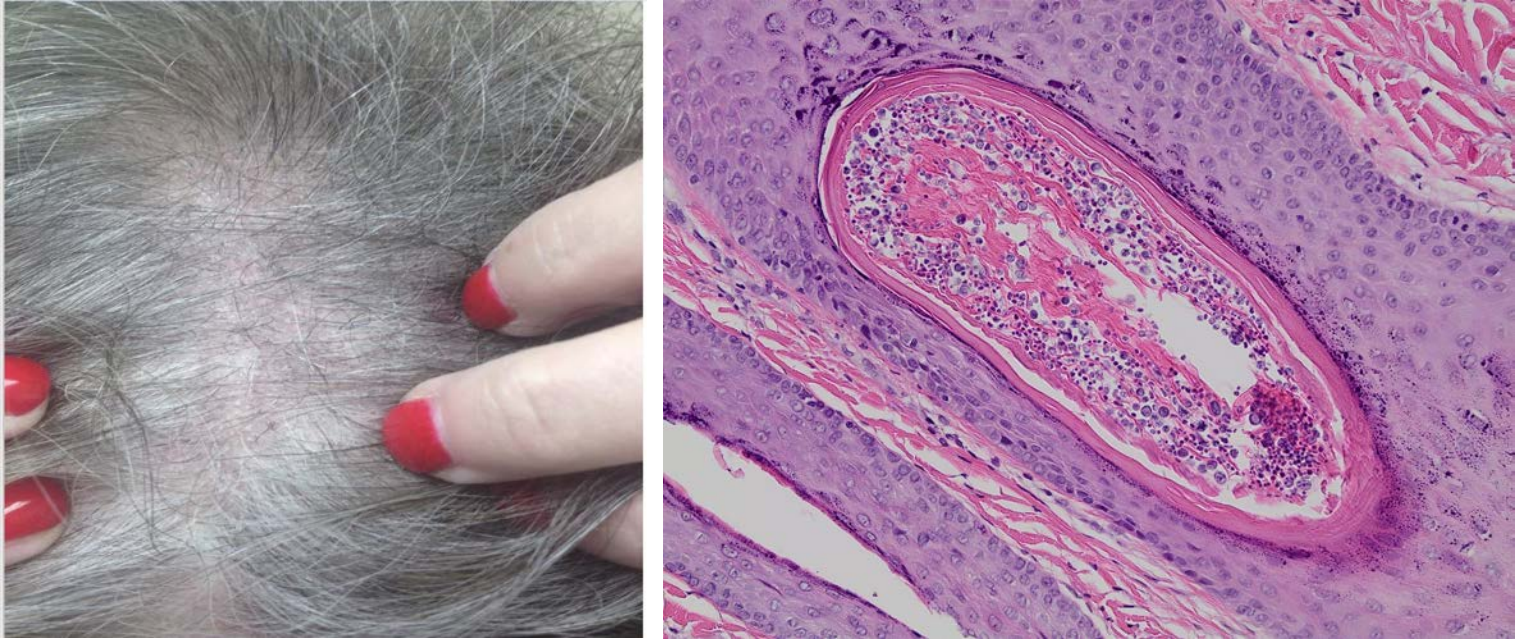


Figure 1. Endothrix Tinea capitis. After suffering with scalp pruritus for two years, this elderly patient presented with scaling, patchy hair loss, mild perifollicular erythema, and almost imperceptible white dots representing broken hairs. A fungal culture grew *Trichophyton tonsurans*. **Figure 2.** Endothrix tinea capitis. Large spore endothrix fungus typical of *T. tonsurans* fills the hair shafts with involvement at the orifice, weakening hairs shafts so that they are easily broken. (Hematoxylin and Eosin, 400x)

Case 2

A 72-year-old woman presented with scalp scaling, hair loss, and pruritus for two years. Treatment with a variety of over-the-counter shampoos proved to be ineffective. Physical examination revealed thick, white scaling with background erythema (Figure 3). A 4 mm punch biopsy from a scaly patch in the scalp revealed a thick mantle of spores around the hair shaft, typical of an ectothrix fungus (Figure 4). A fungal culture grew *Microsporium* sp. The patient was treated with terbinafine 250 mg daily for 4 weeks and cleared completely. The patient did have a cat with scaling and hair loss. The animal was referred to the veterinarian for treatment.



Figure 3. Ectothrix tinea capitis. Several 3 cm crusty, psoriasiform patches with associated hair loss and accentuation of scaling at follicular orifices was present at the apex of the scalp in this elderly patient. A fungal culture grew *Microsporium* sp.

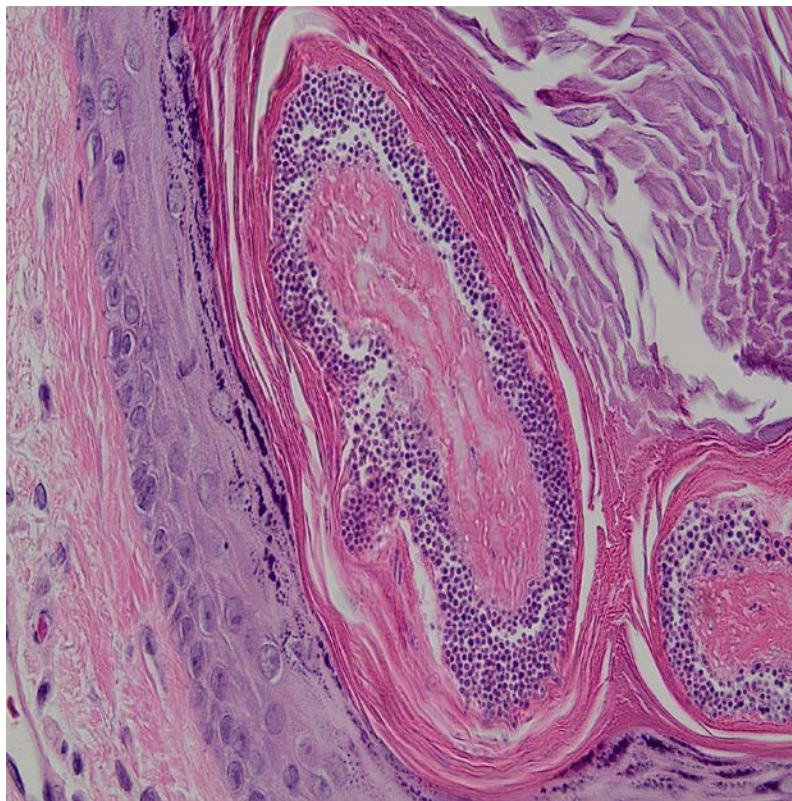


Figure 4. Endothrix tinea capitis. A mantle of spores with a “doughnut” appearance is present around expanded hair shafts inside dilated hair follicles (Hematoxylin and Eosin, 400x)

Discussion

These cases of scalp scaling, pruritus, and hair loss required biopsies for diagnosis and these demonstrated tinea capitis. This caused us to rethink our view that tinea capitis is rare in adults. When scaling is present in the scalp in such patients, physicians are more likely to suspect common papulosquamous conditions of the scalp, such as seborrheic dermatitis, lichen simplex chronicus, lichen planopilaris, or psoriasis [4]. Although the presence of alopecia is a clue to the possibility of tinea capitis and broken hairs are a clue to *Trichophyton tonsurans* large spore endothrix fungus, physicians focusing on more common causes of scalp scaling (seborrheic dermatitis and psoriasis) may assume hair loss is induced by rubbing and scratching.

Subtle differences in the clinical appearance of tinea capitis may be noted depending upon the causative organism. *Trichophyton tonsurans* is usually an asymptomatic indolent disease in adults [5]. This form of tinea capitis is caused by an anthropophilic fungus that establishes a symbiotic relationship with its human host. It often presents with mild perifollicular scaling and very little inflammation. In fact, 30% of adults who contract *T. tonsurans* from their children demonstrate no signs or symptoms other than slight dandruff [6]. Perifollicular erythema, expanded hair shafts, and follicular plugging in these patients can resemble lichen planopilaris. The diagnosis is also complicated by the fact that broken hair shafts of elderly patients with fine white hair do not appear as “black dots” as they do in dark haired light skinned children [7]. Hematoxylin and eosin staining, even without PAS or GMS staining demonstrates a large spore, endothrix fungus.

More severe inflammation is associated with dermatophyte fungi more commonly present on an infected animal (zoophilic) or in the soil (geophilic) [8]. Patients are commonly exposed to *Microsporum* from a dog or cat (*M. canis*) or farm animals (*M. nanum*). *M. audouinii* is present in soil that is rich in keratinous material [9]. These superficial fungi produce broad, erythematous, psoriasiform scaly plaques in the scalp. *Microsporum sp* are ectothrix fungi, which produce a thick rim or mantle of spores around the hair shaft. The shaft is invaded by hyphae producing weakened, easily broken hairs.

Although the true incidence of tinea capitis in adults is unknown, physicians should maintain a high index of suspicion and promptly perform a KOH preparation, fungal culture, or biopsy from scaling alopecic patches, especially in patients who are not responding to treatment for seborrheic dermatitis or psoriasis [10]. A KOH scraping should include both scale and stubbly, broken hairs to increase the sensitivity of this test. When specimens are obtained for fungal culture, copious amounts of scale can be achieved by rubbing a glass microscope slide against the scalp. The scale is collected in a sterile container available in the clinic. Fungal cultures can definitively determine the genus and species of a fungus but take as long as a month to grow. When biopsies are obtained, the requisition should include a comment about the possibility of tinea to prompt PAS or GMS staining in

case the fungus is not readily apparent on H&E stains. Finally, Wood's lamp can be useful to screen adults in the nursing home setting when *Microsporum sp.* are present. Of course, Wood's lamp examination is negative in patients with *T. tonsurans*.

In adult tinea capitis, determining the species of the fungus by culture is clinically significant since it may point to the source of infection. For instance, if *T. tonsurans* is identified, the children in the family should also be examined and if infected, treated concurrently. It may be wise to screen asymptomatic family members with fungal cultures since asymptomatic scalp carriage is common in household contacts [11]. When *Microsporum sp.* are identified, animals with scaling skin and hair loss should be tested and treated to eliminate this reservoir of infection. Finally, systemic treatment is required when the diagnosis of tinea capitis is made since topical agents cannot penetrate to infected hair follicles deep within the dermis. Identification of the causal dermatophyte by fungal culture directs the choice of systemic therapy. Tinea capitis caused by *Trichophyton sp* are uniformly responsive to treatment by oral terbinafine in just 2 weeks [12]. *Microsporum canis*, however, can be resistant to the usual dose of terbinafine (250 mg daily) and may require treatment of 4 weeks or longer for a successful clinical and mycological response [12]. Griseofulvin may be a preferred agent using high doses of 20mg/kg/day [13]. Other authors have suggested that itraconazole 200 mg daily should be used for serious *M canis* infections or when infections prove to be insensitive to terbinafine [14].

Conflict of Interest: Robert T. Brodell, M.D., discloses the following potential conflicts of interest: honoraria have been received from presentations for Allergan, Galderma, and PharmaDerm, a division of Nycomed US Inc. Consultant fees have been received from Galderma Laboratories, L.P. Clinical trials have been performed for Genentech and Janssen Biotech, Inc

Jeremy Jackson discloses: Speaker's bureau for Celgene

Isabella C. Auchus, Melissa J. Brents, and Kimberley Ward have no conflicts of interest.

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