



Case Report

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Never Too Young to Suspect a Fungal Infection



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Abstract

We report on a 15-day-old Caucasian healthy boy, presenting with quickly spreading annular lesions of the scalp and forehead. Microscopic examination and culture confirmed the diagnosis of tinea capitis.

The objective of this article is to raise awareness, discuss the differential diagnoses and underline the need for adequate investigations to prevent diagnostic failure in the rare cases of tinea capitis in infants, necessitating systemic treatment.

Keywords: Dermatophytosis, tinea capitis, infant, griseofulvin, itraconazole, fluconazole, terbinafin

Introduction

Tinea capitis is rare in neonates and hair loss is not prominent, therefore the diagnosis may be easily overlooked. Diagnosis, however, is easy if microscopic examination and fungal cultures are done. As in older children systemic treatment is recommended, but the evidence in the literature is low and based on individual

case reports. In general, systemic treatment for infant tinea capitis is well tolerated and serious adverse events are exceptional in healthy babies. We report a neonate presenting with initial lesions of tinea capitis at the age of 15 days and discuss important differential diagnoses and treatment options.



Figure 1: Annular scaling lesions on the A front and B scalp. C Microscopic examination showing filaments on coloration with fluorescein, D culture positive for *Microsporum canis*.

Case Report

A 23 day-old boy was referred to our pediatric dermatology clinic with annular lesions on his face and scalp, occurring at the age of 15 days (Figure 1A and B). The child was otherwise in perfect health. He presented small-to-medium sized annular erythematous patches on the right forehead and all over the scalp with some scaling at the border. Hair loss was not prominent. These patches, were rapidly expanding. His mother reported she had similar lesions on the abdomen during her pregnancy around the 4-5th month, which had healed without any treatment before delivery. Otherwise the pregnancy was uncomplicated and the mother had no previous medical history. The family possesses a domestic cat. A topical treatment with terbinafine cream and ketoconazole shampoo was given to the neonate.

Result

During the consultation, a direct microscopic examination was positive for fungal filaments (Figure 1C). At control, two weeks after consultation mycological culture was positive for *Microsporum canis* (Figure 1D). Although lesions already improved drastically with the topical treatment, on dermoscopy some affected (corkscrew) hairs were still visible. Therefore, itraconazole sirup 5mg/kg in one dose was added as a pulse treatment (2 week-treatment, 2 weeks stop and again 2 week-treatment).

The domestic cat was confirmed to be infected by the veterinarian and was treated with a systemic antifungal as well.

Discussion

Tinea capitis in infants is rare in Western countries. A review in 2017 [1] retrieved 20 cases in the literature and described 4 new cases of infants under the age of 2 years. Since Zhou reported 4 other cases in 2022 [2], Xiao a 23 day old newborn [3], Mandras a baby of 1 year [4] and Kumar 2 other infants [5].

In 12 of these infants lesions appeared before the age of 1 month. In our patient lesions were first seen at the age of 15 days. We assume infection occurred the first days of life, as incubation time is estimated between 1 and 2 weeks. Lesions had the typical annular "ringworm" aspect (Figure 1). Hair loss was not prominent, probably linked to the presence of only anagen vellus hair growth typically seen at the neonatal age [6].

At this very young age, the most important differential diagnosis is neonatal lupus erythematosus [7] which is not always congenital but may develop within 12-16 weeks post-partum. Face and scalp, less frequently trunk and extremities are typically affected, but the characteristic peri-orbital location may be absent. As in tinea, lesions usually are annular or polycyclic; however the characteristic scaling seen in tinea is absent. It is an auto-immune disease due to the placental transfer of maternal IgG anti-Ro/SS-A, anti-La/SS-B or rarely anti-U1RNP antibodies. Annular erythema of infancy [7] is another differential diagnosis however, with a more cyclic course, they disappear within 36-48h and reappear elsewhere on the body including the face. Lesions are also annular

but the border is frequently palpable and may present tiny blisters. Acute hemorrhagic edema of infancy and urticaria [7] also frequently present annular lesions but the course is more acute and especially in the former one lesions are usually purpuric and fever is associated. Eczema either seborrheic or atopic has also to be differentiated [1].

However, these diseases are easily distinguished by microscopic examination [8] either with KOH preparation or fluoresceine, which shows the typical filaments. Culture eventually identifies the responsible dermatophyte on average after 10-14 days after sampling. PCR and other molecular techniques [8] may be used in unclear or doubtful cases. Dermoscopy may also be of help in identifying affected hairs [8]. Barcode, corkscrew, and comma hairs are signs of tinea infection [5,8].

The fungi responsible for tinea capitis in infants differs according to the region of residence/ travelling: *Microsporum canis* in Western countries [1,3,4,9,10], *Trichophyton tonsurans* in African Americans, *Microsporum audouini* in African countries [1]. *Trichophyton rubrum* [1,11] and *Trichophyton mentagrophytes* [2] have also been reported.

Concerning treatment there is consensus that systemic treatment is, similar to older children, indicated [8,12]. Topical treatment alone is not frequently used, although in very young children not yet having undergone the physiological shedding and replacement of their lanugo hair, topical treatment could probably be sufficient [1].

Different case reports have proven that systemic treatment in infants is safe [1-4,13]. Choice of drug may depend on the dermatophyte involved [12,13]. *Microsporum* species have a better sensitivity to itraconazole. It exists in a sirup formulation and has been used in a dose of 5-10mg/kg per day [1]. Pulsed regimens of 1-2 weeks on drug, 2 weeks off drug and again 1-2 weeks of treatment have been proposed [11,14,15]. Griseofulvine has been the standard treatment for many years, but is difficult to obtain in many countries, among them Switzerland. Dosage is 15-25 mg/kg/d for at least 6 weeks [1,12]. Fluconazole 6-12mg/kg for 5-6 weeks is an alternative [1]. Finally, terbinafine is in some countries the first line treatment for *Trichophyton* species [8]. It may be used in a dosage of 10mg/kg/day in infants [2]. This higher dosage would also have a better efficacy for *Microsporum* species [10,16]. We agree with Zampella that treatment should only be stopped if a negative control culture is obtained [1] as resistance is an upcoming problem [8].

Thus far no side effects have been reported in infants treated with any of these drugs [1,12]. In older children and adults, hepatic injury has been reported with all 4 drugs but particularly with itra- and fluconazole, gastro-intestinal problems with all 4 drugs, photosensitivity may be a complication of griseofulvine and itraconazole is contra-indicated in patients with a cardiomyopathy. Hematological side effect are rarely reported with terbinafine [1,11,12]. There is a lot of discussion if

laboratory (hematological and hepatic tests) are indicated before and during treatment. Aleohin [17] reported, in a prospective study of pediatric tinea capitis treated with either griseofulvin or terbinafin, laboratory anomalies in 20%. Most were mild; only in one this lead to abrogation of the medication [17]. The German guidelines only advise blood checks in children with other especially hepatic pathologies, or if concomitant medication is taken [18].

Important is to disinfect all materials in contact with the infected region [18,19] and to treat the reservoir (animal or contact persons). Children treated orally and topically can continue their daily and social activities [8].

We have chosen itraconazole, because of its good efficacy against *Microsporum canis*, it's availability in a child-friendly sirup formulation, and because it is licensed on the local pharmaceutical market in Switzerland.

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