

CASE REPORT

Successful treatment of fungal ball-associated tinea capitis in a healthy infant: An unusual presentation

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Key Clinical Message

Presentation of tinea capitis with fungal mass in an infant is extremely rare. Tinea capitis with and without abscess formation is prone to be misdiagnosed in infants and should be considered as a differential diagnosis of inflammatory hair loss in infants and toddlers as well as school-aged children.

Abstract

Tinea capitis is the scalp fungal infection that most often affects early school children. It rarely affects neonates and adults. The presentation of fungal ball in the setting of tinea capitis is extremely rare. Herein, we describe a 7-month-old girl with a fungal ball associated with tinea capitis with a scalp mass adjacent to the scalp dermatophytosis. To our knowledge, this is the first case of fungal ball in a healthy infant with tinea capitis.

KEYWORDS

dermatophytosis, fungal ball, hair loss, infant, tinea capitis

1 | INTRODUCTION

Clinical manifestations of tinea capitis vary depending on the species of dermatophyte, the type of hair invasion, and the extent of the inflammatory host response.¹ Although two classical and typical presentations of tinea capitis including non-inflammatory and inflammatory forms, it may appear with abscess formation² as an unusual presentation.¹ Tinea capitis is mainly seen in pre-pubertal children between 6 and 10 years of age.³ It rarely affects infants and adults.⁴

There are limited reports of tinea capitis in infants and small children. Therefore, the epidemiological characteristics of tinea capitis in this age group are still unknown.⁵

Tinea capitis is relatively rare among infants. Therefore, many aspects of the disease are still unknown in this group of age. It is more likely to happen in boys than in girls.⁶ Tinea capitis is more common in conditions like poor hygiene, low socioeconomic status, crowded living areas, urban settings, and the presence of immunodeficiency states.⁷

To our knowledge, fungal ball formation following tinea capitis in a healthy infant has never been described in previous case reports. The aim of this report was to illustrate the unusual clinical features of a child who experienced the abovementioned complication in the setting of scalp dermatophytosis. We also aimed to compare the features of our case with those of infant cases with tinea capitis previously reported in the literature.

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2 | CASE PRESENTATION

A 7-month-old female infant with no prior significant medical history presented with erythematous crusted papules and plaques associated with hair loss on the occipital region for 20 days. Three days before hospitalization, a slight bulging developed above the left retro-auricular area in association with bilateral cervical lymphadenopathy on lateral and posterior cervical nodes and fever.

The patient was living in a rural area with close contact with domestic animals. Family history revealed; her elder brother had similar lesions on the scalp. On admission, the patient was febrile and had a severe inflammatory reaction with a large area of partial hair loss and scattered pustules on the occipital and left retro-auricular area. The bulging area progressed to a painful, erythematous ball with fluctuation (Figure 1). A thorough examination was performed, and there was not any other lesion besides the scalp. Lesions were localized exclusively to the scalp.

She had multiple painful bulging areas associated with scales, erythema, tenderness, and warm to the touch compatible with kerion. In addition to kerion, the patient had a well-defined fluctuating purulent area.

The result of scalp scraping via direct microscopic examination of the hair loss area with potassium hydroxide (KOH 10%) was positive for hyphae and spores. Gram stain was also done, and methicillin-resistant *Staphylococcus aureus* infection was reported. So, there was a fungal infection with a bacterial superinfection.

Griseofulvin is the standard treatment of pediatric tinea capitis but due to the unavailability of griseofulvin in Iranian market, terbinafine (62.5 mg per day) was started. Also, intravenous clindamycin (10 mg/kg/dose) every 6 hours, ketoconazole cream 2% twice daily, and Ketoconazole shampoo were started. Two months later, the lesions regressed and KOH smear evaluation became negative.



FIGURE 1 Scalp dermatophytosis associated with fungal ball. A large area of partially hair loss in association with an erythematous ball on the left retro-auricular area.



FIGURE 2 Scalp dermatophytosis associated with fungal ball. Post-treatment regression of lesions.

With clinical suspicion of abscess formation in the bulging area, ultrasonography showed a possible abscess formation area. The patient underwent incision and drainage with a 3-day Penrose drainage tube. The result of the content of the abscess was positive for dermatophytosis which was consistent with the scalp scraping.

According to clinical and laboratory findings, scalp dermatophytosis associated with fungal ball formation was diagnosed.

The results of all immunological screening tests for evaluation of any immune deficiency state were normal, and any associated immunocompromised condition was ruled out.

Due to the high-grade fever ($T=39^{\circ}\text{C}$), irritability, and PO (per OS) intolerance, the child was hospitalized for 10 days (Figure 2) and treatment with parenteral antifungal was continued for 6 weeks. At the end of the treatment period, all the clinical manifestations of the disease had disappeared. No side effects associated with the treatment were observed. After 2 years of follow-up, there was no evidence of relapse of the disease or immune deficiency condition. At 2 years, hair loss was permanent in a part of the lesion on the abscess drainage location, but there was hair re-growth on the other part of the primary lesion.

3 | DISCUSSION

Presentation of tinea capitis with fungal mass in an infant is extremely rare. The point that makes our case very impressive is the age of the patient, fungal ball formation in the setting of a normal immune state, and response to the treatment.

Tinea capitis is uncommon in infancy, and there are limited cases of tinea capitis in this period so it is prone to misdiagnosis.⁴ Clinical manifestations of tinea capitis are various in infants, including alopecic patches,

scaling, annular erythema, broken hairs, or even kerion and favus.^{4,5} Scalp dermatophytosis, with or without abscess formation, should be considered as a differential diagnosis for any hair loss patches, particularly those with epidermal changes. Any delay in diagnosis and treatment may result in more extensive scalp involvement and lead to complications such as permanent hair loss.^{4,5}

Low socioeconomic conditions, contact with farm animals,⁸ and also positive family history⁹ can increase the risk of tinea capitis. As mentioned, our case had a close contact with domestic animals with a positive family history that were risk factors in this case.

The predominant causative agent of tinea capitis in our region, as well as other geographical areas, varies with time.¹⁰ It happens due to variations of lifestyle, environmental conditions, or fungal adaptation.¹⁰ A number of studies introduce anthropophilic *Trichophyton violaceum* and *Trichophyton schoenleinii* as the most common agents in Iran,¹⁰⁻¹² although a recent study showed the predominance of zoophilic variants of *Trichophyton interdigitale* and *Microsporum canis*.¹³

Seborrheic dermatitis, atopic dermatitis, neonatal lupus erythematosus, Langerhans cell histiocytosis, impetigo, nummular eczema, psoriasis, erythema annular centrifugum, and annular urticaria are the main differential diagnosis in infants with scalp dermatophytosis.^{14,15}

Kerion is an inflammatory presentation of tinea capitis in children.¹⁶ It clinically manifests as a boggy plaque with alopecia, pustules, and purulent drainage that may be accompanied by cervical or suboccipital lymphadenopathy.¹⁶ The main differential diagnoses of kerion are impetigo, folliculitis, and abscesses.¹⁷

Our patient had multiple painful bulging areas associated with scales, erythema, tenderness, and warm to the touch compatible with kerion. In addition to kerion, the patient had a well-defined fluctuating purulent area diagnosed as a fungal ball.

Severe and progressive tinea capitis with abscess formation has been reported in a 7-year-old child who presented with inflammatory abscess-like lesions of the scalp.¹⁸ Oral clindamycin and terbinafine revealed no improvement. Therefore, a surgical excision on the scalp lesion was done. Cultures revealed the presence of bacterial agents and fungal filaments. Finally, oral griseofulvin 200 mg twice daily and local Ketoconazole shampoo improved the lesions after 3 months. Our case, in contrast to this aforementioned case, had improvements by receiving systemic clindamycin, terbinafine, and surgical incision and drainage.

Some of the reported cases of purulent tinea capitis were first misdiagnosed as a bacterial abscess¹⁹ and were treated with multiple courses of antibiotics without improvement.¹⁹ Also, there is a report of two children who underwent incision and drainage of their pus-filled

swellings under local and general anesthesia as an inappropriate medication.²⁰

Tinea capitis and kerion can lead to long-term complications such as permanent scarring alopecia.⁵ Arenas et al. studied 19 patients with kerion and five showed scarring alopecia.²¹ Also, other cases reported this due to delayed diagnosis and treatment.^{19,22} So that, treatment should be initiated promptly to prevent these complications and associated psychological distresses.

Cutaneous fungal balls are rare mycotic infectious masses characterized by a tangled accumulation of fungal mycelia.²³ Immunosuppressive conditions, malignancies, diabetes, or long-term use of antibiotics are some risk factors for fungal ball formation in infants.²⁴

Limited evidence suggests that newer treatments such as terbinafine, itraconazole, and fluconazole are as good as griseofulvin as the common treatment option for tinea capitis.²⁵

Our patient had no any known immunodeficiency state, and the reason for the development of fungal ball is still unclear. Nonetheless, it can be the result of overgrowth and excessive accumulation of infectious agents in pre-existing tinea capitis infection.

4 | CONCLUSION

The picture of our case strongly argues tinea capitis is prone to be misdiagnosed in infants. Tinea capitis with and without abscess formation should be considered as a differential diagnosis of small/large areas of inflammatory hair loss in infants and toddlers as well as school-aged children.

AUTHOR CONTRIBUTIONS

Bahareh Abtahi-Naeini: Supervision; writing – review and editing. **Atefeh Payandeh:** Writing – original draft; writing – review and editing. **Fereshte Rastegarnasab:** Writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The data supporting this study's findings are available on request from the corresponding author.

ETHICS STATEMENT

This manuscript has been ethically approved by the “Ethics committee of Isfahan university of medical sciences, Isfahan, Iran,” and the approval ID is as follows: IR.ARI.MUI.REC.1402.009.

CONSENT

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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