




A Clutching Claw: Unexpected Coexistence of Pediculosis Capitis and Tinea Capitis

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Received 2023 November 21; Revised 2023 December 09; Accepted 2023 December 16.

Abstract

Introduction: Pediculosis capitis and tinea capitis are very common superficial infections/infestations, primarily affecting school-aged children. The overall pediculosis capitis infestation rate exceeds 25% in some studies, and the occurrence rate for tinea capitis may be as high as 45%. They are more prevalent, but not exclusively, in crowded conditions and environments with low socioeconomic status. Scaly scalp is a common presentation of tinea that may be, at first glance, confused with pediculosis nits.

Case Presentation: Here, we describe a case report showing the coexistence of both tinea capitis and pediculosis capitis in a young girl, supplemented with an interesting photograph of a nymph of *Pediculus humanus* capitis attached by its claws to a hair, with dystrophic endothrix hairs in the background. We also describe further fungal culture performed, with the result and the treatment the patient received.

Conclusions: Tinea and pediculosis should always be excluded first in case of a scaly scalp in children. Whether their coexistence is attributed to a causal relation and not simply a poor environment is still to be investigated. This is especially important because body louse is a proven vector for a number of pathogens; however, this is still a matter of debate for head louse.

Keywords: Lice Infestations, Tinea, Nymph

1. Introduction

Pediculosis capitis and tinea capitis primarily affect school-aged children. The causative dermatophyte species of tinea capitis varies across geographical regions (1). In contrast, *Pediculus humanus* capitis is responsible for pediculosis capitis worldwide. The coexistence of both infections in the same patient is rare (2).

The overall pediculosis capitis infestation rate amongst school-age children may reach more than 25% in some studies (3). Children with lice infestations may be completely asymptomatic; however, there is usually some pruritus. The itching can be severe, leading to excoriations, secondary impetiginization, and cervical lymphadenopathy. Identification of crawling adult lice and/or the nits, mainly in the occipital and retroauricular scalp, confirms the diagnosis (4).

Tinea capitis also mainly affects children worldwide, with a higher frequency in tropical and subtropical regions and an estimated occurrence rate of up to 45%

in some studies (5). Tinea capitis can present with a multitude of clinical manifestations, including alopecic patches, scaly scalp that may be confused with nits, inflammatory changes in kerion with purulent discharge, and the possibility of cicatricial changes.

2. Case Presentation

Herein, we present a 9-year-old girl presenting to our Mycology Clinic for an extensively scaly scalp with multiple focal areas of alopecia. The alopecic patches showed broken hairs, consistent with the clinical diagnosis of black dot tinea capitis. Hence, to confirm the diagnosis of tinea capitis, scrapings from the hair stumps were collected for potassium hydroxide (KOH) smears and fungal culture. Scrapings of hair stumps from the alopecic patches were examined with 10% KOH under light microscopy. At 200X magnification, to our surprise, a nymph of *P. humanus* capitis was seen attached by its claws to a healthy hair, with dystrophic hairs seen



Figure 1. Six-legged nymph (according to appearance, the third nymph) of *Pediculus humanus capitis* attached by its claws to a hair. Next to the nymph, there is a dystrophic hair parasitized by fungal spores (endothrix). The sections are visualized using 10% potassium hydroxide under light microscopy at 200X magnification

in the background (Figure 1). Clinically, pediculosis might have been obscured by the heavy scalp scaling. The dystrophic hairs on higher (400X) magnification showed endothrix fungal spores. The culture of the scrapings on Sabouraud dextrose agar (SDA) revealed, after 2 weeks, the growth of *Trichophyton violaceum*, which is endemic to our geographical region (1). The child was prescribed both systemic griseofulvin at a dose of 10 mg/kg for tinea capitis and topical 5% permethrin lotion for pediculosis.

3. Discussion

The simultaneous acquisition of pediculosis capitis and tinea capitis is rarely reported. Also, the visualization of pediculi in scrapings is unusual and, hence, rather an interesting site.

The definitive diagnosis of pediculosis capitis can be made upon identifying crawling lice on the scalp hair. Nits alone are not diagnostic of active infestation unless they are very close to the scalp, are dark-colored, and contain larvae (6). In our case, the nymph was clearly demonstrated on a wet mount of scraped hairs.

Clinical diagnosis of tinea capitis is usually confirmed by KOH-prepared wet mount of plucked hairs or hair stumps collected by scraping or brushing. The location of

the fungal spores in relation to the hair shaft (endothrix or ectothrix) can give a clue about the causative dermatophyte species, which should be confirmed by fungal cultures as SDA. Sabouraud dextrose agar contains dextrose, peptone, agar, and chloramphenicol to inhibit bacterial growth. Fungal growth is expected within 2 to 4 weeks. The gross appearance of the culture and stained culture mounts can accurately specify the causative dermatophyte subtype (7). The presence of endothrix suggests that the etiological agent belongs to the *Trichophyton* fungal genus. Waxy, glabrous, wrinkled, deep purple colonies (like the ones that were isolated from our case) are characteristic of *T. violaceum* (8).

Permethrin, a synthetic pyrethroid, interferes with sodium transport in the parasite, subsequently causing neural depolarization and, hence, respiratory paralysis. Permethrins are considered safe with low toxicity, and retreatment in 7 to 10 days is advised for the recently hatched nymphs (9). Although the 5% concentration is mainly used for scabies, it is currently used for pediculosis to overcome the resistance to the 1% preparations. Other lines of treatment for pediculosis include mechanical lice/nit removal using wet combing or other chemical preparations, such as lindane 1% and malathion 0.5% (6). Griseofulvin is FDA (Food and Drug

Administration)-approved for treating tinea capitis. It is considered the drug of choice, especially in children, with high cost-effectiveness, cure rate, and easy accessibility. Griseofulvin is a microtubule assembly inhibitor that interferes with the formation of the mitotic spindle; hence, it inhibits mitosis in dermatophytes (10).

Body louse is a known vector for *Bartonella* organisms (*B. quintana*, *B. recurrentis*) (11), as well as for louse-borne relapsing fever, trench fever, and epidemic typhus, by transmitting different *Rickettsia* species (*R. prowazekii*, *R. rickettsii*) (12). However, whether head lice also serve as a vector is still inconclusive (13).

Studies found that head lice can pass infective *Rickettsiae* in their feces (14). Other studies showed that head lice could harbor a number of bacterial pathogens, such as the DNA of *B. quintana* (15), *Coxiella burnetii* (16), *Borrelia recurrentis* (17), and even *Acinetobacter* (16). However, the mere presence of a bacterial organism in an arthropod does not necessitate the ability to transmit it to humans and cause a disease in the infested individual (13).

The question remains whether the coexistence of tinea and pediculosis capitis is mainly attributable to overcrowding, poverty, and poor hygiene or whether the head lice might have a role in harboring and transmitting dermatophytes (2).

Footnotes

Authors' Contribution: I am the sole author and contributor to this case report.

Conflict of Interests: The author declares there is no conflict of interest.

Data Reproducibility: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available.

Funding/Support: There is no funding/support.

Informed Consent: The patient's and her caregivers' consents were obtained. No identifying data or images are presented in the manuscript.

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