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Case Report

KERION TYPE OF TINEA CAPITIS TREATED WITH DOUBLE PULSE DOSE TERBINAFINE

Tinea Capitis Treated with Double Pulse Dose Terbinafine

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ABSTRACT

Background: *Tinea capitis is a common dermatophyte infection affecting hair and skin which always requires systemic treatment to get a clinical and mycologic cure, preventing relapse, and infection spread. Griseofulvin has been the antifungal therapy of choice for tinea capitis, but it often requires higher doses and a longer duration than recommended. Thus, effective alternative antifungal with good oral tolerability and shorter course of treatment are therefore required. The objective of this report is to evaluate the effectiveness of double pulse dose terbinafine for tinea capitis alternative therapy.* **Method:** *A case of kerion type of tinea capitis in a two-year-old girl was reported. Diagnosis was established based on clinical manifestations of alopecia, presented as erythematous macule with pustules, hemorrhagic crusts, and scales on the scalp, accompanied with occipital lymphadenopathy. Fungal culture showed growth of Microsporum canis (M. canis) colonies. Patient was treated with doubled pulse dose terbinafine 125 mg/day and 2% ketoconazole shampoo for two months.* **Result:** *Clinical improvements were found on 35th day of follow up, while mycologic cure was achieved on 60th day of follow up. Tolerability was excellent and no side effects observed.* **Conclusion:** *Double pulse dose terbinafine is effective for kerion type of tinea capitis*

Key words: *double pulse dose, kerion, M. canis, terbinafine, tinea capitis*

ABSTRAK

Latar Belakang: *Tinea kapitis merupakan infeksi jamur pada folikel rambut dan kulit yang membutuhkan terapi sistemik untuk mencapai kesembuhan klinis dan mikologis, mencegah kekambuhan, dan penyebaran infeksi. Griseofulvin merupakan terapi pilihan untuk tinea kapitis. Namun, griseofulvin seringkali membutuhkan dosis lebih tinggi dan durasi pengobatan lebih lama dari yang direkomendasikan. Oleh karena itu, terapi oral antijamur alternatif yang efektif dengan toleransi baik dan jangka pengobatan lebih pendek sangat diperlukan. Laporan kasus ini bertujuan untuk mengevaluasi efektivitas terbinafin sebagai terapi alternatif untuk tinea kapitis.* **Metode:** *Dilaporkan satu kasus tinea kapitis tipe kerion pada anak perempuan berusia dua tahun. Diagnosis ditegakkan berdasarkan gambaran klinis alopesia dengan permukaan kulit kepala berambut berupa makula eritema dengan pustula, krusta sanguinolenta, dan skuama, disertai limfadenopati oksipital. Kultur jamur menunjukkan pertumbuhan koloni Microsporum canis (M. canis). Pasien mendapat terapi dengan terbinafin dosis denyut ganda 125 mg/hari dan sampo ketokonazol 2 % selama dua bulan.* **Hasil:** *Perbaikan klinis tampak pada hari ke-35, sedangkan kesembuhan mikologis didapatkan pada pengamatan hari ke-60. Terbinafin dapat ditoleransi dengan baik tanpa ada efek samping yang terjadi.* **Kesimpulan:** *Terbinafin dosis denyut ganda efektif untuk tinea kapitis tipe kerion.*

Kata kunci: *dosis denyut ganda, kerion, M. canis, terbinafin, tinea kapitis*

INTRODUCTION

Tinea capitis is a common dermatophyte infection affecting hair and skin which frequently caused by *Trichophyton* and *Microsporum* species.[1,2,3] Human, animal, and fomite (i.e. object or article of clothing or dish that may be contaminated with infectious organism and serve in their transmission) contact spread are potential sources of infection.[4,5] Clinical appearance of tinea capitis may varied, including inflammatory and noninflammatory type.[6,7,8] Kerion is one of tinea capitis type[2,5] which represents its inflammatory form.[2,3]

Griseofulvin has been the gold standard for tinea capitis since the late 1950s.[2] Griseofulvin recommended duration for tinea capitis is 6-12 weeks[2,5] or until the patient tests negative for fungi.[2] The increased failure rate necessitating higher doses and longer treatment course required that will increases the risk of nonadherence[3] has lead to consideration of newer antifungal agents.[7]

Terbinafine is an allylamine antifungal agent [9,10,11] which has been approved by Food and Drugs Association (FDA) as tinea capitis alternative therapy in children aged two years [12] or older.[8,12,13] Side effects of terbinafine are uncommon[2,13] and include gastrointestinal symptoms, rashes, and headache.[2]

Terbinafine daily dose is 62.5 mg/day for children weighing less than 20 kg, 125 mg for weighing 20–40 kg, and 250 mg for those weighing more than 40 kg.[9,10,14] The pulse therapy consisted of one week treatment duration followed by three week period without treatment.[11] Double dose administration in this case is twice standard dose that is given to children based on the body weight. This report will describe a case of kerion type of tinea capitis in a two-year-old girl, weighs 16 kg, treated with doubled pulse dose terbinafine 125 mg/day for two months.

CASE

A two-year-old girl was taken by her parents to Dermato-Mycology Division, Department of Dermatology and Venereology, Dr. Hasan Sadikin General Hospital, Bandung, Indonesia with the chief complaint of alopecia on occipital area, presented as erythematous macule with pustules and pruritus. History of outside activities and frequent contact with soil were denied, but history of contact with cat which appeared to have skin problem was admitted. Patient took bath twice a day using water from the well, liquid soap, and shampoo. Patient also used personal towel, comb, and rarely used hat. Previous similar history was denied.

On physical examination, there was one cm in diameter of occipital lymphadenopathy, rubbery, and nontender on palpation. On the right occipital scalp area, there was an erythematous macule, 6x7cm, irregular-shape, clear border alopecia, with pustules, hemorrhagic crust, and scales on the skin surface.

Dermatological State

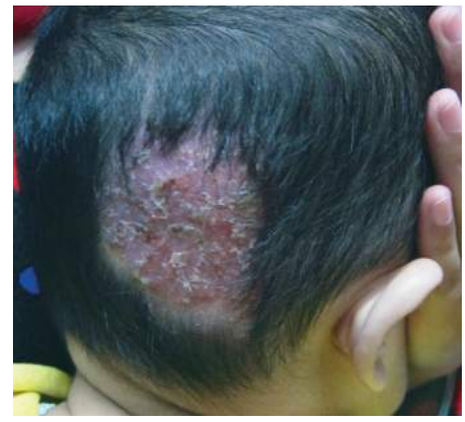

Figure 1. Lesion on occipital area of the scalp. Note the 6x7 cm solitary area with irregular-shape, clear border alopecia, with erythematous macule, pustules, hemorrhagic crust, and scales on the skin surface.

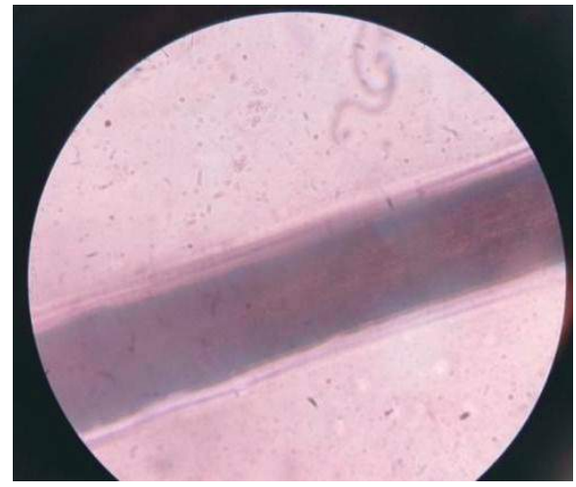

Figure 2. Direct microscopic examination of hair and skin scraping from scalp lesion using KOH 20 % + blue-black Parker® ink solution revealed no hyphae nor spores on identification. were identified.

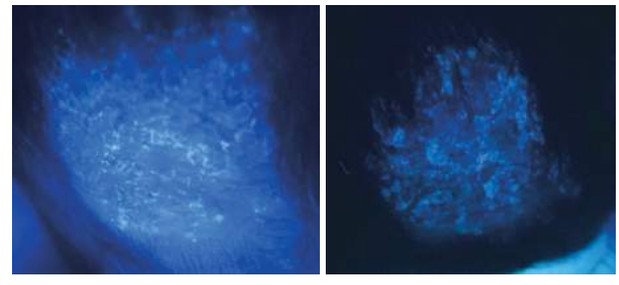

Figure 3. Wood's lamp examination showed no fluorescency

Direct microscopic examination of hair and skin scraping from scalp lesion using potassium hydroxide (KOH) 20 % added with blue-black Parker® ink solution revealed no hyphae nor spores. Direct microscopic examination from pustule on the scalp lesion using Gram

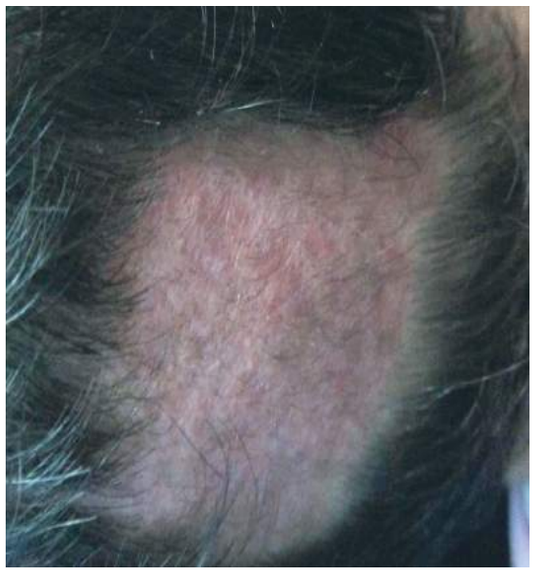

Figure 4. Lesion on 35th day: Note the improvement with decreased erythema and normal hair growth in almost all area of the scalp skin surface. Patient felt no more itchy at these moment.

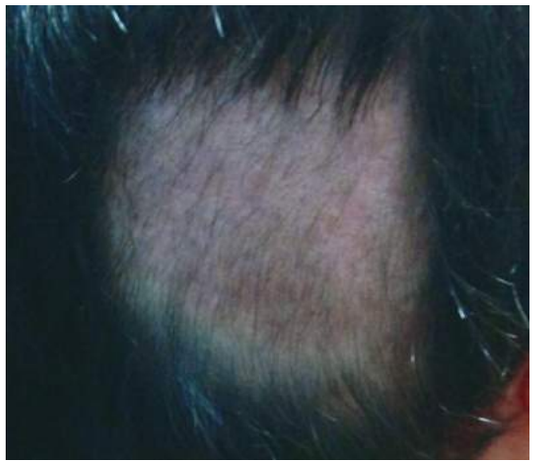

Figure 5. Lesion on 60th day of follow up

staining demonstrated epithelial cells, polymorphonuclear (PMN) cells, and Gram positive cocci. Wood's lamp examination showed no fluorescence. Fungal culture revealed *Microsporum canis (M. canis)* growth.

In this case, patient was treated with terbinafine 125 mg/day for one week-followed by three drug-free-weeks, topical ketoconazole 2% shampoo applied on scalp 3x/ week, cetirizine 1x1/2 tea spoon/day, and amoxycillin clavulanic acid 3 x ½ teaspoon. Clinical improvements were seen as erythema on scalp and itching were decreasing after one month of therapy. Treatment was well tolerated with patient has no experienced any side effect along the therapy regimen. Normal hair growth over the alopecia area has begun and the culture gave negative result on day-60.

DISCUSSION

Tinea capitis commonly affects children [9,15] aged less than 12 years old with a peak incidence at 3–7 years old.[16] In this report, the patient is a two-year-old girl. On the basis of host preference and natural habitat, the fungal causes may be anthropophilic, zoophilic, or geophilic.[2] The source for most tinea capitis infections in children and infants are human and animal.[2,5] The patient in this case had a contact history with cat and no similar complaint in her family. Thus, it can be speculated that this infection spread is *zoophilic*.

Kerion is an inflammatory type of tinea capitis [2,3] with painful mass [6] that can be accompanied by malaise,[3] fever,[2,3] and occipital lymphadenopathy.[2] Kerion lesion may take form as nodules[2] with induration,[3] pustular mass,[2,3,8] and vesicles[3] Infected scalp may be inflammed with pustule eruptions,[2] but secondary infection may also exist.[12]

Kerion diagnosis in children is often delayed, especially when pustular symptoms are misdiagnosed as bacterial infection. On physical examination, bacterial folliculitis may mimic kerion with tender lesion of erythematous plaques associated with pus. However, carbuncle rarely causes alopecia,[17] because the infection does not reach the hair bulb.[18] Delay in diagnosis and/or improper treatment may lead to complication and infection to other individuals.[5]

Patient's history taking and physical examination supported the diagnosis of kerion. The patient in this case had clear border alopecia, irregular shape, presented as erythematous macule, and itch, accompanied with pustules, hemorrhagic crust, and scales. Wood's lamp and microscopic examinations demonstrated negative results. Somehow, fungal identification through culture is necessary to establish the diagnosis and etiology of tinea capitis.[2,3,5]

Wood's lamp examination may help diagnosing tinea capitis, but it has poor sensitivity.[3] Microscopic examination of inflammatory type tinea capitis may also give negative result.[9,16] Thus, fungal culture for identification of tinea capitis etiology should be done.[3,19] If the clinical index of suspicion is high, therapy should be initiated after the culture specimen is obtained because it take time for confirming the culture results to establish the diagnosis.[8] The result of patient's fungal culture showed *M. canis* growth. Based on the result, we can conclude the diagnosis and etiology of this patient is kerion type of tinea capitis which is caused by *M. canis*.

Tinea capitis requires systemic treatment because topical antifungal could not penetrate to the deepest part of the hair follicle [2,20] nor eradicate the infection. Furthermore, the use of topical antifungal treatment alone may contribute to develop a carriers and cause transmission, since symptoms and clinical signs are minimal, but mycologic cure has not been achieved.[20] Adjunctive topical therapies have been shown to decrease the viable spores responsible for the

disease contagiousness, reinfection, and may shorten the duration of therapy courses. Ketoconazole shampoo should be applied three times weekly until the patient is clinically and mycologically cured. [21]

Some considerations in systemic therapy administration for tinea capitis are high efficacy level of treatment, low relapse rate, time and cost effectiveness, as well as safety. Griseofulvin is considered to be the treatment of choice for tinea capitis[10] for its effectiveness and safety to dermatophyte infection. Somehow its main disadvantage is the long duration of treatment required which may lead to reduced compliance.[2] Griseofulvin therapy duration which is recommended for tinea capitis is 6-12 weeks or until clinical and mycologic cure are achieved.[2] Also, griseofulvin requires continuous administration because it has low affinity for keratin.[22]

Terbinafine offer a shorter therapy duration and a less variable absorption compared to griseofulvin. Terbinafine absorption is not altered when taken with food, so the administration is easier compared to other systemic antifungals, such as griseofulvin and itrakonazole, which should be given with food.[15] Terbinafine is also very lipophilic and keratinophilic, so it can be distributed to adipose, epidermis, dermis,[2] hair,[2,10] nail,[2] and it can persist until one month after the treatment was stopped.[23]

Terbinafine also has less side effect compared to griseofulvin[5] and safe, including in pregnancy. Moreover, terbinafine rarely interacts with other medication.[24] Since its availability in 1991, terbinafine has been approved for the management of tinea capitis in many countries including Australia, New Zealand, China, Japan, Holland, and India.[15]

Terbinafine has fungicidal effect to dermatophytes since it inhibits squalene epoxidase[2,24] that leads to a decrease in ergosterol which is an essential component of fungal cell membranes.[15,24] Panagiotidou et al.[14] studied the efficacy and tolerability of terbinafine use for eight weeks in children with tinea capitis caused by *M. canis*. In that study, highest mycologic cure rate (97,1 %) was gained in dosage use of 7-12,5 mg/kg/day, followed by cure in 91,3% patients with dosage between 6-7 mg/kg/day, and 2,7 % in patients with dosage 3,3-6 mg/kg/day. Koumantaki et al.[25] experimented on terbinafine dosage for tinea capitis and stated that oral terbinafine should be given at a daily dose according to body weight: 125 mg for patients weight 10-25 kg and 250 mg/day for patients weight > 25 kg. Terbinafine can be administered in pulsed and continued dose. An advantage of terbinafine pulse therapy for tinea capitis over the continuous regimen is that it allows the physician to individualize the treatment schedules so that just sufficient therapy is administered to gain a cure. The decision to give a second or third pulse of terbinafine was based on the clinical appearance of the lesion prior to the time-point at which the next pulse was due.[11]

Patient in this case was treated with terbinafine 125 mg/day for one week and followed by 3 drug-free-weeks, ketoconazole 2% shampoo applied 3x/week, cetirizine 1x1/2 tea spoon/day to decrease itching, and amoxycillin clavulanic acid 3 x ½ teaspoon for the secondary bacterial infection. Clinical improvement were seen as erythema and itching were decreasing after one month of therapy. More over, normal hair growth over the alopecia area has begun and the culture result came out negative on follow up day-60, so therapy can be discontinued.

Tinea capitis is not life-threatening, but kerion type of tinea capitis may cause scarring and permanent alopecia.[2] Treatment of the animal source of infection is the effort should be made in tinea capitis case.[3] In conclusion, we feel that as regard griseofulvin to remain the antifungal drug of choice in tinea capitis, terbinafine may constitute an alternative drug which is well tolerated and safe.

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