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The Results of the Hospitalized Treatment of Kerion Celsi

Tran Thi Huyen[1,2]*, Nguyen Van Hoang[2]

[1]*Department of Dermatology and Venereology, Hanoi Medical University, Hanoi, Vietnam;* [2]*Department of Outpatient, National Hospital of Dermatology and Venereology, Hanoi, Vietnam*

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***Correspondence:** Dr. Tran Thi Huyen, Hanoi Medical University, Hanoi, Vietnam, 1A Ton That Tung Street, Dong Da, Hanoi, Vietnam. E-mail: drhuyentran@gmail.com
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Abstract

BACKGROUND: Kerion celsi is quite common in children, accounting for a relatively high rate in the form of a scalp fungus, caused by *Trichophyton* or *Microsporum* fungi. Clinical manifestations include painful crusty lesions covered with follicular pustules and systemic symptoms. Treatment requires a combination of several methods.

AIM: This study was conducted to describe the results of inpatient treatment of kerion celsi.

METHODS: This is a cross-sectional descriptive study on 25 in-patients with kerion celsi at the National Hospital of Dermatology from January 2017 to December 2017.

RESULTS: The results showed that male patients accounted for 64%, female patients accounted for 36%; 4–7 years old accounted for 52%. The mean number of days of in-patient treatment was 9.9 days. All patients received systemic antifungals in combination with topical antifungals and systemic antibiotics. There were 24/25 patients with incisions, drainage, and pus cleaning. The rate of lesion clearing after 2–4 weeks was 13%, after 4–6 weeks was 34.8%, and over 6 weeks was 52.2%. After 6 months, all patients had hair regrowth. The rate of patients with scars after treatment was 69.6%.

CONCLUSION: Antifungal therapy along with incision, and cleaning of pus gives gcood results in the treatment of kerion celsi, the most common complication is scarring.

Introduction

Kerion celsi is a scalp abscess caused by filamentous fungi, characterized by a strong inflammatory response and hair loss [1]. The disease was quite common in Europe and the United States in the 20th century and was considered a sign of poverty. At the end of the 20th century, with the development of public health, the quality of personal and community hygiene was improved, along with campaigns to detect and treat thoroughly, and kerion celsi was effectively controlled [2]. At present, the exact incidence is unknown, which varies by region, possibly ranging from 1.5% to 19.8% [3]. The incidence is higher in developing countries. The disease can occur at any age but is more common in children, rarely occurs in adults, and is highest in children 3–7 years old boys who are more commonly affected than girls [1]. Pathogenic fungi species exist in over the world. Pets or other livestock, collectively known as zoonotic fungi, are the main causative agents of scalp kerion. According to a 2009 report in Japan, *Microsporum canis* was the most common pathogen in the period 1981–1985. Meanwhile, in the period 2000–2008, *Trichophyton tonsurans* was the most common pathogen [4]. Vietnam is a country with a hot and humid tropical climate, which is very favorable for fungal strains to develop, increasing the risk of fungal diseases in general and kerion celsi in particular.

In terms of treatment, since the late 1950s, griseofulvin and new generation oral antifungal drugs such as itraconazole, terbinafine, or fluconazole have been used to treat kerion celsi, bringing high efficiency, helping to heal lesions quickly and fight against fungal infections. In many cases, using oral antifungal drugs in combination with incision and drainage of pus is more effective [5], [6]. At the National Hospital of Dermatology and Venereology, many children were diagnosed with kerion celsi, and some of them have to be treated as in-patients because the lesions are large with lot of inflammation. We conducted this study to describe the results of an in-patient treatment of kerion celsi at the National Hospital of Dermatology and Venereology in 2017.

Methods

Patients

Patients with kerion celsi were diagnosed and treated as in-patients at the National Hospital of Dermatology and Venereology, Hanoi, Vietnam, in 2017. The diagnosis was based on the following criteria:

Clinical symptoms

Fundamental lesions of kerion celsi (mandatory criteria): They were painful crusty lesions covered with follicular pustules and surrounded by erythematous alopecic areas that can later evolve into abscesses and leave permanent cicatricial alopecia.

The patients also had other systemic symptoms such as painful swollen lymph nodes, fever, fatigue, eczematous pruritus, itchy papules, and erythema multifrome.

Paraclinical tests

Direct microscopy to find fungi: There were filamentous fungi, fungal spores on the scalp, in the hair shaft, or around the hair and/or cultured on Sabouraud's medium with pathogenic fungi growing. The tests were performed according to the procedure of the Department of fungal-microbiological-parasite testing, National Hospital of Dermatology and Venereology, Hanoi, Vietnam.

Study design and ethical clearance

This was a cross-sectional and descriptive study that had been approved by the Ethical Review Committee on Research Involving Human Subjects, Hanoi Medical University (Number 2081/QĐ-ĐHYHN, dated May 23, 2018). Written consent was obtained from all participants. It was conducted at the National Hospital of Dermatology and Venereology, in Hanoi, Vietnam, from January 2017 to December 2017.

Convenient sample size

The study took all patients with kerion celsi who were diagnosed and treated as in-patients during the period from January 2017 to December 2017 at the National Hospital of Dermatology and Venereology. As a result, 25 patients met the selection criteria.

Steps to conduct the research

We collected patient information according to the research medical record form. General information included patient's first and last names, age, gender, address, admission date, and discharge date. History of tinea capitis or other fungal infections, contact with cats and dogs, medical history and familial history were also collected. Basic lesion examination: Location, number, lesion size, and distribution (alone and clustered); lesion characteristics (swelling, pus, and alopecia). Systemic symptoms such as fever, regional lymphadenopathy, fatigue, and other skin manifestations such as erythema pruritus eczematous, erythema multiforme, and erythema nodosum were examined. Direct microscope for fungi, fungal culture, and routine blood tests was performed. Regarding treatment, some features were described: used antifungal drugs and antibiotics, whether or not an incision was made to drain the pus, the number of days of treatment, time to clear lesions, time to re-grow hair, fungal testing after 6 weeks of treatment, and complications if had.

Criteria for cleaning lesions

No pus, no abscesses, no folliculitis, no swelling, and no pain.

Statistical analysis

Data entry and analysis were conducted using SPSS software version 16.0 (IBM, Armonk, NY, and USA). Differences were considered to be statistically significant at $p < 0.05$.

Results

Characteristics of patients with kerion celsi

In 2017, there were 25 kerion celsi patients hospitalized at the National Hospital of Dermatology and Venereology. The general characteristics of the patients are shown in Table 1. The mean age of the patients was 6.2 ± 2.8 years, the lowest was 2 years old and the highest was 15 years old. The age group with the highest percentage was 4–7 years old (52%), followed by 8–11 years old (24%), 0–3 years old (20%), and the lowest was 12–15 years old (4%). The proportion of men was 64%, and of women was 36%. There were 20% of patients with a history of contact with dogs, 12% with contact with cats, and 32% with contact with both dogs and cats. The time from onset to hospital admission was mostly over 4 weeks (accounting for 56%), followed by <2 weeks (28%) and 2–4 weeks

Table 1: The characteristics of patients with kerion celsi

Characteristics		%
Sex		
Male	16	64
Female	9	36
Age/year		
0–3	5	20
4–7	13	52
8–11	6	24
12–15	1	4
History of animal contact		
With dogs	5	20
With cats	3	12
With both dogs and cats	8	32
The time of disease		
< 2 weeks	7	28
2–4 weeks	4	16
> 4 weeks	14	56
Fungal species		
Microsporum gypsum	3	15.8
Trichophyton mentagrophytes	5	26.3
Trichophyton rubrum	6	31.6
Microsporum spp.	2	10.5
Trichophyton spp.	1	5.3
Negative (fungal culture)	2	10.5

(16%). There were 19 patients cultured to determine the pathogenic fungus strain. The culture results are shown in Table 2. The fungus with the highest percentage was *Trichophyton rubrum* (31.6%), followed by *Trichophyton mentagrophytes* (26.3%), *Microsporum gypseum* (15.8) %), *Microsporum* spp. (10.5%), and *Trichophyton* spp. (5.3%). The negative culture rate was 10.5%.

Table 2: Time of cleaning lesion

Time (weeks)		%
2–4	3	13
4–6	8	34.8
> 6	12	52.2
Total	23	100

The results of the treatment

The duration of in-patient treatment of the patients is shown in Table 3, the shortest was 3 days, the longest was 17 days, and the average number of days of treatment was 9.9 ± 4.1. Of these, 12 patients were treated for 8–14 days (48%); eight patients were treated for 1–7 days (32%), and five patients were treated for longer than 14 days (20%).

Table 3: The time of hospitalization and the methods of treatment (n = 25)

Characteristics	n	%
Time of hospitalization, days		
1–7	8	32
8–14	12	48
> 14	5	20
Total	25	100
Methods of treatment		
Systemic antifungal (griseofulvine, itraconazole)	25	100
Topical antifungal (Clotrimazole)	25	100
Antifungal shampoo (Ketoconazole)	25	100
Systemic antibiotics	25	100
Incision	24	96

Treatment methods are shown in Table 3. All the patients received systemic antifungal drugs combine with systemic antibiotics, shampoo, and topical antifungal. Griseofulvin was used in 19 patients (76%), followed by itraconazole (five patients; accounting for 20%). There were 24 patients with incisions, accounting for 96%.

Regarding the use of systemic antibiotics, nine patients used cefuroxime (36%), followed by amoxicillin combined with clavulanic acid (eight patients; accounting for 32%). There were 6 patients (24%) treated with ceftriaxone, one patient received cloxacillin and one patient received cefazoline (4%). The results are shown in Figure 1.

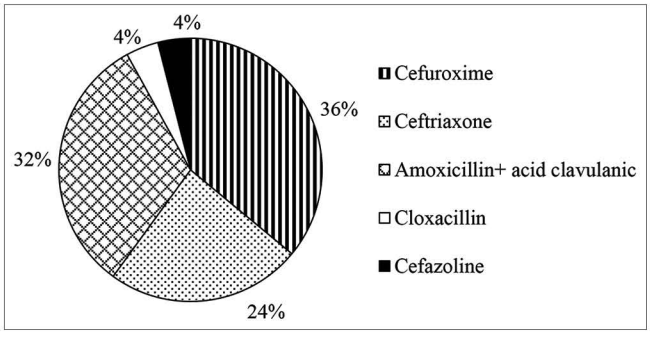

Figure 1: Used systemic antibiotics

Twenty-four patients underwent incisions to drain pus, accounting for 96%. Among them, 18 patients only needed to make an incision once during treatment, accounting for 72%; six patients had to make incisions at least 2 times, accounting for 24%; one patient did not need to extract the lesion during treatment, accounting for 4%. The results are shown in Figure 2.

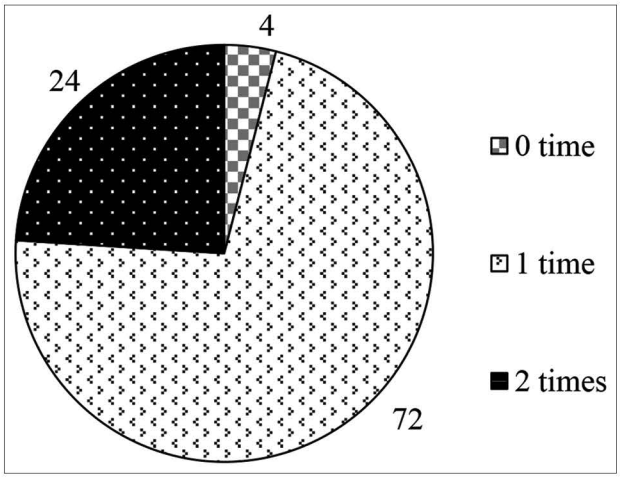

Figure 2: The number time of incisions

Following after discharge

After the patient was discharged from the hospital, we continued to monitor the patient's scalp lesions and other complications, but two patients could not be contacted. The results obtained from 23 patients showed that only three patients had no lesions after 2–4 weeks from the start of treatment, accounting for the lowest rate (13%). In addition, there were eight patients with no lesions after 4–6 weeks of treatment, accounting for 34.8%. Furthermore, there were 12 patients, accounting for the highest percentage (52.2%) that needed more than 6 weeks of treatment to completely clear the lesions (Table 2). There was one patient who did not make an incision during the treatment; the time to clear the lesions was 6–8 weeks. Among 24 other patients with incisions, 11 patients were clear of lesions after more than 6 weeks, accounting for the highest rate (50%), three patients were clear of lesions after 2–4 weeks of treatment, accounting for 13.6%, eight patients had no lesions after 4–6 weeks, accounting for 36.4%. There were six patients tested for fungi after 6 weeks of treatment (26.1%), and all had negative results.

All 23 patients we contacted had hair regrowth at 6 months after treatment. There were 16 patients with scars after the treatment, accounting for 69.6%. There were seven patients, accounting for 30.4%, leaving no scars after the treatment, including one patient who did not have to make an incision during the treatment. There were 16 out of 22 patients who had incisions and left scars, accounting for 72.7%.

Discussion

In our study, the shortest in-patient stay was 3 days, the longest was 17 days. The average number of days of treatment was 9.9 ± 4.1 days. Table 3 showed that 48% of patients were hospitalized for 8–14 days; 32% of patients were hospitalized for 1–7 days; 20% of patients were hospitalized for longer than 14 days. All patients were discharged from the hospital when their condition was stable, scalp lesions were resolved, continued systemic antifungal therapy for at least 6 weeks, and followed up by a dermatologist monthly.

Aste's study on 31 patients showed that 20 patients were treated with griseofulvin fine powder 20–25 mg/kg/day, six patients were treated with ketoconazole 50–100 mg/day and five patients were treated with terbinafine 50 mg/day in children under 20 kg and 125 mg/day in children aged 20–40 kg [7]. All patients received systemic antifungal therapy in combination with imidazole or allylamine topical antifungal cream for 4 weeks. All patients in the study completely recovered after 25–30 days of treatment. The study noted that griseofulvin had some side effects such as headaches or digestive disorders, encountered in over 10% of patients. However, there were no cases causing interruption of treatment. At the same time, there are no reports of any side effects in patients treated with ketoconazole or terbinafine [7]. Like Aste, studies by authors in the world such as Fuller, and Gupta also recommends the use of a combination of drugs, systemic antifungal with topical antifungal, and antifungal shampoo, until the clinical lesions are gone and the test does not find any fungal infections. The appropriate use of topical drugs helps to reduce the spread and destruction of lesions [8], [9].

In our study, all patients received systemic antifungal agents, including 76% of patients using griseofulvin, and 20% of patients using itraconazole. All patients received a combination of topical antifungal medication and shampoo. The results showed that 100% of patients were completely free of lesions after 2 months. Of the latter only 13% of patients cleared of lesions after 2–4 weeks from the start of treatment, accounting for the lowest rate, 34.8% of the patients were cleared of lesions after 4–6 weeks of treatment, and 52.2% of patients needed more than 6 weeks of treatment to completely clean the lesions, accounting for the highest percentage (Table 2). The study did not record any cases of clinical recurrence of similar symptoms and there were no reports of adverse events during systemic antifungal use.

There have been no studies supporting antibiotic use in patients with kerion [8]. However, in our study, all patients were given systemic antibiotics after an incision to drain pus. Among them, cefuroxime was used in 36% of patients, amoxicillin plus clavulanic acid was used in 32% of patients, 24% of patients used ceftriaxone, one patient used cloxacillin, and one patient used cefazolin (Figure 1). The cause of antibiotic use was related to the risk of nosocomial infections, especially after wound extraction. The study did not record any cases of secondary superinfection.

Twenty-four patients underwent incisions to drain pus, accounting for 96%, of whom 72% of patients had 1-time incisions, and 24% of patients had to make at least two incisions during treatment. One patient did not receive an incision during treatment (Figure 2). This patient was admitted to the hospital early when the scalp lesions did not abscessed and were prescribed systemic antifungal treatment, clinical follow-up showed good progress, so he was not allowed to make an incision to drain the pus, and the lesions were covered after more than 6 weeks. In the group of incisions, 50% of patients were clear of lesions after more than 6 weeks, accounting for the highest percentage, 13.6% of patients were clear of lesions after 2–4 weeks, and 36.4% of patients were clear of lesions after 4–6 weeks. Due to the study's limited sample size, it is impossible to confirm the role of incision to drain pus with time to remiss totally the lesion.

The study did not record any cases of clinical recurrence of similar symptoms within 6 months. This was explained by the fact that all of the patients we contacted were on full systemic antifungal medication by day. After finishing the treatment regimen, some patients continued to use antifungal shampoo.

Experts recommend treating kerion celsi with griseofulvin for 6–12 weeks, and itraconazole for 2–6 weeks. The lesions can clear up after a short time of treatment; however, that does not mean that the filamentous fungi and fungal spores have been destroyed. Therefore, it is necessary to treat for a full time according to the regimen or stop the drug earlier if the fungal test is negative. In our study, six patients were tested for fungi after 6 weeks of treatment (26.1%), all of them gave negative results. This was an optimal result.

All the patients in the study we contacted had hair regrowth <6 months from the start of treatment. No cases of permanent hair loss were recorded. Aste's study of 31 patients showed 10% of permanent hair loss cases (patients without incisions to drain the pus) [7]. Another Danish study of 18 patients showed only five patients with normal hair growth after treatment (accounting for 27.8%) [10]. Hair regrowth may be related to patient's ability to adhere to treatment and time to clear lesions. In our study, all patients had good adherence and were free of lesions 2 months after the treatment. The latter accelerated scalp's ability to heal, which helps explain why all patients had re-grow of hair within 6 months of starting treatment.

The scalp is a thick and multi-layered skin organization rich in nourishing blood vessels, so the lesions in this area heal quickly but are also prone to

form scars. The lesions of the scalp kerion are pus-filled cavities on the swollen skin background, the lesions spread rapidly, and causing compression of the adjacent skin. In particular, for patients who came to the hospital late or came to the hospital after improper self-treatment at home, the lesions have spread, even broken, and poor recovery. This increases the risk of scarring on the scalp.

In our study, up to 69.6% of patients left scars after the treatment. There was one patient who did not make an incision during the treatment, leaving no scars after the treatment. Up to 72.7% of patients had incisions that left scars after the treatment. It was not possible to confirm that an incision to drain pus increases the rate of scarring after treatment because the sample size is not large enough. However, to minimize the risk of scarring in patients undergoing incisions, the procedure should be operated with caution, precision, gentleness, and minimal trauma. To make the incision neat, it is necessary to use a very sharp knife, not use scissors, make a definitive incision once, and do not make multiple incisions. Furthermore, choose an incision that coincides with the skin folds or is parallel to the stretch lines, so that the wound is less likely to open and the scar is hidden. If it is not possible to make an incision along those lines, a straight incision should be avoided because the scar is prone to shrinkage. Curved or S-shaped incisions should be used. The incision is wide enough, the lowest place to drain all the pus. At the same time, consideration should be given to the time indicated for the incision to drain the pus. Because the incision is drained when the lesions have not festered or have dried, the pus has been cleared, causing the patient to suffer unnecessary trauma. However, late purulent drainage incision when the lesions have spread, poor recovery, even broken through complicated broken lines, increases the risk of scarring after treatment.

Conclusion

Kerion celsi can be well treated by medical methods (systemic and local antifungal, systemic antibiotics) combined with incisions, and draining of pus. The patients were all clear of lesions and hair regrowth after 6 months. The most common complication is scarring.

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