

頭癬在東台灣二十八例之分析

郭文勵 江哲恩*

佛教慈濟醫院 皮膚科 衛生署花蓮醫院 皮膚科*

Tinea Capitis in Eastern Taiwan: An Analysis of 28 Cases

Wen-Lee Kuo Jer-En Chiang

We diagnosed 28 cases of culture-proven tinea capitis in eastern Taiwan between July 1991 and February 2001. The patients included 11 children and 17 adults, from 1 to 79 years old. There were 25 females and 3 males. All the 3 male patients were boys. The median age was 5 years for children and 61 years for adults. *Microsporum canis* was the most common isolated dermatophyte (9 cases), followed by *Trichophyton violaceum* (8 cases), *Trichophyton tonsurans* (5 cases), *Trichophyton rubrum* (4 cases) and *Trichophyton mentagrophytes* (2 cases). Eight of the 11 children were infected by *M. canis* from cats. Anthropophilic dermatophytes were main causative agents of 17 adult patients, all were women and majority (88%) of them were above 50 years old. This bimodal distribution of patients and causative fungi, also reported in southern and northern Taiwan, represents a new trend of tinea capitis in the past 2 decades. (*Dermatol Sinica* 20 : 180-185, 2002)

Key words: Tinea capitis, Taiwan

吾人於1991年7月至2001年2月在東台灣診斷出28例經培養確認之頭癬，包括11名孩童及17名成人，年齡介於1歲至79歲之間。其中女性有25名，另有男性3名，全部為男童。孩童之平均年齡為5歲，成人為61歲。犬小芽孢癬菌最常被培養出(9例)，以下依序為堇色毛髮癬菌(8例)；禿髮毛髮癬菌(5例)；紅色毛髮癬菌(4例)；鬚瘡毛髮癬菌(2例)。11名孩童中有8名感染源自貓之犬小芽孢癬菌。17名成人全為女性，多數超過50歲，以親人性皮癬菌為主要致病菌種。此兩極化之病人及致病菌種分佈，亦見於台灣南部及北部，代表近二十年頭癬之新趨勢。(中華皮誌20：180-185, 2002)

From the Department of Dermatology, Buddhist Tzu Chi General Hospital

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Reprint requests: Wen-Lee Kuo, M.D., Department of Dermatology, Buddhist Tzu Chi General Hospital, 707, Chung Yang Rd., Sec.3, Hualien, Taiwan TEL: 03-8561825 ext. 3271 FAX: 03-8577161

INTRODUCTION

The occurrence and etiology of tinea capitis changes over time and depends on the geographic localization. Half century ago, it was a common pediatric dermatosis in Taiwan, accounting for 3% of elementary school children.¹ The incidence of tinea capitis decreased dramatically after 1960s and was infrequently diagnosed in northern Taiwan during recent two decades.^{2,3} A new trend of tinea capitis, mainly affecting adult women of southern Taiwan, was found in recent 10 years.^{4,5}

Although surveys of this dermatophytosis have been conducted in Taiwan by several authors, these studies were focused on western part of the island.¹⁻⁶ The aim of this retrospective study is to gain insight into the occurrence, pathogen and clinical significance of tinea capitis in eastern Taiwan.

PATIENTS AND METHODS

From July 1991 to February 2001, 31 patients of tinea capitis were diagnosed in our outpatient dermatological clinics. Three cases were excluded from this study because fungal culture failed to grow dermatophyte in two cases and was not done in one. The clinical types, findings of potassium hydroxide (KOH) smear from plucked hairs or black dots, Wood lamp examination of the scalp, results of fungal culture, associated disorders, treatment modality and the clinical outcome of all patients were reviewed. Clinical features of all cases were defined into black-dot, gray patch, pustular inflammatory and kerion according to classification by Sehgal *et al.*⁷ The infected hair was cultured on Sabouraud dextrose agar and Mycobiotic agar containing chloramphenicol and cycloheximide.

RESULTS

The clinical and mycological data for the 28 culture-proven patients of tinea capitis are presented in Table I. The age and sex distribution are listed in Table II. Twenty-five patients were females and 3 patients were males, with ages ranging from 1 to 78 years. All the 3 male

patients were boys. The median age was 5 years for children and 61 years for adults. No teenager was involved.

Five species of dermatophytes were isolated. *Microsporum canis* was the most frequent etiologic agent (9 cases), followed by *Trichophyton violaceum* (8 cases), *Trichophyton tonsurans* (5 cases), *Trichophyton rubrum* (4 cases) and *Trichophyton mentagrophytes* (2 cases).

KOH smears of the plucked hairs or black dots revealed endothrix fungi in 14 cases, including 7 cases infected with *T. violaceum*, 5 cases with *T. tonsurans*, one each with *T. rubrum* and *M. canis*. Ectotrix fungi were found in 12 cases, including 8 cases with *M. canis*, 3 cases with *T. rubrum* and 1 case with *T. mentagrophytes*. In other two cases, no fungus was found in KOH smears.

The distribution of causative agents between children and adults is shown in Table III. The zoophilic *M. canis* was isolated in 9 cases (32%). All but 1 case were children. Pet or stray animal could be identified as source of contagion in 7 cases. Examination of Wood lamp was carried out in these 9 cases; all showed bright green fluorescence. Anthropophilic species including *T. violaceum*, *T. tonsurans* and *T. rubrum* were isolated in 17 cases (60%), all belonged to adult patients except 2 girls (case 19, 20) from the same family infected by *T. violaceum*.

The correlation of clinical features and causative agents is shown in Table IV. Black-dot type (10 cases) was the most common found clinical feature, followed by gray patch and pustular inflammatory type (8 cases each). Only 2 cases developed kerion, both were children. Of 10 cases of black dot type, 5 cases yielded *T. violaceum*, 3 yielded *T. tonsurans* and one each yielded *T. rubrum* and *M. canis*. Of the 8 cases of gray patch type, 5 yielded *M. canis*, 2 yielded *T. rubrum* and 1 yielded *T. violaceum*. Of the 8 cases of pustular inflammatory type, two each was due to *T. violaceum*, *T. tonsurans*, *M. canis*, and one each was due to *T. rubrum* and *T. mentagrophytes*. In one each of the kerion type,

M. canis and *T. mentagrophytes* was found.

Twenty-six patients (93%) received oral antifungal treatments, including griseofulvin, ketoconazole, itraconazole and terbinafine respectively. 2 patients were treated by topical imidazole due to impaired liver function. Oral antibiotics and/or prednisolone were also given in 9 patients with clinically marked inflammatory reactive lesions. Four weeks of

oral antifungal treatment is the minimal requirement to cure the infection in our patients.

DISCUSSION

The present series reveals a bimodal distribution of patients of tinea capitis in Hualien area. Eight of our 11 pediatric patients were caused by *M. canis*, a zoophilic dermatophyte from pet or stray animals, mainly due to

Table I. Clinical and mycological features of 28 patients with tinea capitis in eastern Taiwan

Case No.	Sex/ Age	Clinical Features	KOH Smear	Wood lamp	Fungal Culture	Animal Contact	Treatment	Course	Associated Conditions
1	F/59	G	Ecto	NP	Tr	-	Ke	not cured	-
2	F/65	G	Ecto	NP	Tr	-	Im	1 wk, loss	-
3	F/61	P	Ecto	NP	Tr	-	Itr, A	7 wks, cured	-
4	F/77	B	Endo	NP	Tv	-	Gr	not cured	-
5	F/51	P	-	NP	Tv	-	Gr, A, Pr	7 wks, cured	-
6	F/61	B	Endo	NP	Tv	-	Itr	6 wks, cured	-
7	F/64	P	-	NP	Tm	-	Gr, A	8 wks, cured	-
8	M/7	K	Ecto	NP	Tm	-	Gr, A, Pr	4 wks, not cured	-
9	F/41	B	Endo	-	Tv	-	Itr	1 wk, not cured	Tinea faciei
10	F/2	G	Ecto	GF	Mc	Cat	Ter	9 wks, cured	Tinea corporis
11	F/66	P	Endo	-	Tt	-	Ter, A	4 wks, cured	Nun, Tinea pedis et unguium
12	F/65	P	Endo	-	Tt	-	Ter, A	1 wk, loss	Nun
13	F/64	B	Endo	-	Tt	-	Ter	12 wks, cured	Nun, Tinea pedis et unguium
14	F/56	G	Endo	-	Tv	-	Itr	6 wks, cured	Nun
15	F/2	P	Ecto	GF	Mc	Cat, dog	Ter	2 wks, loss	-
16	F/9	K	Ecto	GF	Mc	-	Itr, Pr, A	4 wks, cured	-
17	F/10	P	Ecto	GF	Mc	Cat	Itr, A	4 wks, not cured	-
18	F/70	B	Endo	NP	Tr	-	Ter	4wks, cured	Tinea faciei, pedis et unguium
19	F/5	P	Endo	-	Tv	-	Itr, Ter, A	8wks, not cured	Tinea corporis
20	F/1	B	Endo	-	Tv	-	Ter	2 wks, not cured	-
21	F/1	G	Ecto	GF	Mc	Cat	Itr	3 wks, not cured	-
22	M/2	G	Ecto	GF	Mc	Cat	Itr, Ter	8 wks, not cured	-
23	F/30	B	Endo	-	Tv	-	Te	10 wks, cured	Tinea unguium
24	F/60	B	Endo	GF	Mc	-	Itr, Ter	11 wks, cured	Tinea faciei
25	F/6	G	Ecto	GF	Mc	Cat	Itr	7 wks, cured	-
26	M/8	G	Ecto	GF	Mc	Cat	Itr	2 wks, not cured	-
27	F/73	B	Endo	-	Tt	-	Ter	1 wks, not cured	Tinea faciei, pedis, corporis et unguium
28	F/78	B	Endo	-	Tt	-	Im	8wk, not cured	Tinea pedis, cruris et unguium

M:Male; F:Female; B:Black dot; G:Gray patch; K:Kerion; P:Pustular inflammatory;

Ecto:Ectothrix; Endo: Endothrix; NP:Not performed; GF:Green fluorescence; Tv: T. violaceum; Mc:M. canis;

Tt:T. tonsurans; Tr:T. rubrum; Tm:T. mentagrophytes; Im:Imidazole(topical); Ke:Ketoconazole(oral);

Itr: Itraconazole; A:Antibiotics; Gr:Griseofulvin; Pr:Prednisolone; Ter: Terbinafine

Table II. Numbers of cases according to age and sex

Age(Yrs)	Male	Female	Total
0-10	3	8	11
11-20	0	0	0
21-50	0	2	2
51-60	0	4	4
> 61	0	11	11
Total	3	25	28

Table III. Causative agents of tinea capitis in children and adults

	<i>T. violaceum</i>	<i>T. tonsurans</i>	<i>T. rubrum</i>	<i>T. mentagrophytes</i>	<i>M. canis</i>
Children (n=11)	2	0	0	1	8
Adults (n=17)	6	5	4	1	1
Total (n=28)	8	5	4	2	9

Table IV. Correlation of clinical features and causative agents

Clinical feature	<i>M. canis</i>	<i>T. violaceum</i>	<i>T. tonsurans</i>	<i>T. rubrum</i>	<i>T. mentagrophytes</i>	Total
Black dot	1	5	3	1	0	10
Gray patch	5	1	0	2	0	8
Pustular inflammatory	2	2	2	1	1	8
Kerion	1	0	0	0	1	2
Total	9	8	5	4	2	28

cat contact in our cases. Anthropophilic dermatophytes including *T. violaceum*, *T. tonsurans* and *T. rubrum* were main causative agents of 17 adult patients, all were women and majority (88%) of them were above 50 years old. No teenagers were involved in this series; a finding strongly suggested different pathogenesis or infectious route of tinea capitis between children and adults.

In Taiwan, tinea capitis was well recognized as a disease of prepubertal boys before 1960s. During a survey of elementary school children in 1957, Lu found 78 boys and 2 girls with tinea capitis, accounting for 2.98% of surveyed children.¹ In another survey carried out 5 years later, 129 boys and 5 girls were found to have tinea capitis, accounting for 1.39% of all children.² The author attributed the decreased

incidence of tinea capitis to forced treatment by school authorities in early 1960s. Tinea capitis has become an infrequently diagnosed disease of children since then. In a recent survey of school children in Taitung County, only 2 out of 3029 (0.07%) children were infected.⁸ On the other hand, reports in recent 2 decades on outpatient clinic basis revealed increased cases of female pediatric patients (Table II). It has been suggested that shorter haircuts of boys in the past caused easier access of pathogen and longer hairstyle fashionable for boys in recent years reversed the infection rate.⁹

Tinea capitis is always well known as a pediatric dermatosis in most parts around the world. Adults only consisted of 2 to 11% of published cases.⁹⁻¹² On the contrary, adults accounted for 17 (62%) of our patients. The

median age of adult patients was 61 years and all of them were women. These findings were very similar to a report in southern Taiwan.⁴ In that series, Lee and Hsu found 27 cases of tinea capitis over a 2-year surveyed period. Seventeen (63%) of their patients were over 18 years of age and all involved adults were women with a median age of 56 years. Combining these data and personal experiences in northern Taiwan, we believe a new trend of this dermatophytosis is formed in the whole island.

The causative agents of tinea capitis in different areas of Taiwan during recent 4 decades were summarized in Table V. The predominant pathogens have changed from *M. ferrugineum* and *T. violaceum* prior to mid 1960s to *T. violaceum*, *T. tonsurans* and *M. canis* in recent 2 decades. We emphasize the importance of differentiation between anthropophilic and zoophilic species, not only for epidemiological concern, but also for clinical and therapeutical reasons. The anthropophilic dermatophytes *T. violaceum* and *T. tonsurans*, mainly infecting middle-aged or elderly women, cause black-dot lesions with scaling and/or hair loss but usually without significant inflammation. A high degree of clinical suspicion is essential to make correct diagnosis since the initial lesions on scalp may be very small. We diagnosed 4 elderly nuns from the same temple, three infected by *T. tonsurans* and one by *T. violaceum*, all presented with profound pruritus of scalp for months or years with persistent scanty erythema and scaling, a clinical manifestation very similar to seborrheic dermatitis of scalp. After thorough inspection of

the whole scalp with magnifying lens, several areas of black dots within diffuse 1-2 mm long shaved hair stumps were found. We failed to identify the typical black dots in one patient during first visit; partially due to hair cut hours before. Further investigation is needed to determine the possibility of transmission of pathogen by hair cut instruments.

The zoophilic dermatophyte *M. canis* was found in 8 children and 1 adult. Seven of the 9 patients had history of contact with pet or stray cats. Five patients presented with patches of scaling alopecia but lack of inflammation, so called "gray patch" ringworm. The other 4 patients developed more marked inflammatory reaction, either as scattered suppurative folliculitis (3 cases) or kerion (1 case). *M. canis* is the predominant dermatophyte of tinea capitis in most countries of Europe and Australia, especially in pediatric patients.^{9,11-15} However, previous surveys of school children in Taiwan failed to identify this pathogen. In recent decade, we have also diagnosed increasing numbers of patients of tinea corporis caused by this dermatophyte. The infection was most prevalent among children and young women who had a history of contact with stray and domestic animals, mainly cats or dogs. Since asymptomatic infected animals may show little or no alopecia, some patients never relate their diseases to previous contact with animals. Since avoidance of contact with animals is mandatory to complete cure of this dermatophytosis, a routine inquiry about contact with animal can help clinicians to identify this pathogen.

Table V. Causative agents of tinea capitis in Taiwan

Causative agent	Taipei	Taipei	Tainan	Hualien
	1957 ,1962 (n=132) ^{1,2}	1983-1992 (n=14) ³	1988-1992 (n=65) ⁴	1991-2001 (n=28)
<i>M. canis</i>	0	5	7	9
<i>T. violaceum</i>	15	6	41	8
<i>T. tonsurans</i>	0	0	6	5
<i>T. rubrum</i>	1	1	4	4
<i>T. mentagrophytes</i>	1	1	6	2
<i>M. ferrugineum</i>	115	1	1	0

We were surprised by the results of fungal culture of 2 patients (case 18 and case 24) who presented with typical black dots clinically and endothrix spores under KOH examination. The organisms isolated were ectothrix dermatophytes *T. rubrum* and *M. canis* respectively. Since both patients had concomitant tinea faciei, a possible mixed infection by two species of dermatophytes may explain this clinicomycologic discrepancy. However, subsequent fungal cultures after oral antifungal therapy failed to grow any dermatophyte.

Concerning treatment of tinea capitis, oral antifungal therapy is generally needed to achieve a clinical and mycological cure. Although itraconazole and terbinafine have in large part replaced the role of griseofulvin in the treatment of dermatophyte infection, in large controlled studies griseofulvin continues to exhibit greater or equal efficacy in tinea capitis.¹⁶⁻¹⁸ According to our observations, 4 weeks of oral antifungal treatment is the minimal requirement to cure the infection. The lack of compliance with the long course of oral medication is the primary reason of treatment failure in the present series. Some patients were also reluctant to receive oral antifungal agents due to fear of side effects.

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