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■ 원 저 ■

A Clinical and Mycological Study of Superficial Fungal Diseases (VIII)

Eun Sil Han, Seong Jun Seo, Myeung Nam Kim, Chang Kwun Hong and Byung In Ro

Department of Dermatology, College of Medicine, Chung Ang University, Seoul, Korea

=Abstract=

Background: Superficial fungal infections are common diseases in the dermatologic conditions. The prevalence of superficial fungal diseases is not static but change under the influence of various factors such as climate, migration of people, and development in prophylaxis and therapy.

Objective: The authors performed this study to investigate the present status of superficial dermatophytoses and some changes on the frequency of the diseases, sex distributions and varieties of the causative organisms.

Methods: The clinical and mycological study of superficial fungal diseases on 2,115 patients who had visited Department of Dermatology, University Hospital and Yongsan Hospital, College of Medicine, Chung Ang University between July 1992 and June 1994 were performed.

Results: 1) The incidence of superficial fungal diseases to total number of outpatients(8,048) was 26.3%(2,115 cases). 2) Superficial fungal diseases showed high incidence in fourth (22.3%), third(22.2%), and fifth decade(17.9%). 3) The ratio of male to female was 2.3:1(1,478:637). Especially in patients with tinea(T.) cruris, which was the most prominent disease showing male predominance, the sex ratio was 15.9:1. 4) The monthly prevalences of superficial fungal diseases were high in July(16.5%), June(13.1%), and August(12.3%), respectively. 5) The incidence of each type of superficial fungal disease was the highest in T. pedis(21.4%), followed by T. cruris(17.6%), candidiasis(17.6%), T. corporis(13.5%), T. unguium(13.3%), T. versicolor (9.6%), T. manus(5.1%), and T. capitis(1.9%). 6) There were coexisting fungal infections in 426 patients(20.1%), and the case of T. pedis with T. unguium was the most common. 7) The positive rate of KOH scraping was 57.4% and the positive rate of culture on ordinary Sabouraud's dextrose agar media was 48.6%. 8) The most common cultured organism was *Trichophyton(T.) rubrum*(39.1%), followed by *Candida species*(34.6%), *T. mentagrophytes*(23.0%), *Microsporum canis*(2.0%), *Epidermophyton floccosum*(1.2%), and *T. ferrugineum*(O.2%).

Conclusion: These results are not significantly different from those of previous studies. But the incidence of the superficial fungal diseases(26.3%) was higher than previous studies and showed a high incidence in young male patients and in warm season. The positive rate of KOH scraping(57.4%) was lower than previous studies. The most common causative organism was *T. rubrum.*

Key Words: Superficial fungal infection, Clinical and mycological study

† Corresponding Author: Myeung Nam Kim, Department of Dermatology, Yongsan Hospital, College of Medicine, Chung Ang University, 3-ka, Hangang-ro, Yongsan-ku, Seoul 140-757, Korea

INTRODUCTION

Superficial fungal infections are among the most prevalent medical conditions in all humans regardless of race, age, economic status, sex, or geographic origin. Most of superficial fungal infections are caused by a homogenous group of keratinophilic fungi called dermatophytes, which include Trichophyton, Microsporum, and Epidermophyton[1]. In addition to the dermatophytes, other organisms are sometimes involved in skin infections. These include a great variety of yeasts and molds.

Certain dermatophytes are geographically restricted and endemic only in particular part of the world. But troop movements, migration of labor, emigration, social habits, and rapid worldwide travel have all contributed to the changing distribution of ringworm[1].

Since 1959 when Suh[2] first reported the nationwide study of fungal diseases, many studies on the clinical and mycological aspects of superficial fungal infection have been reported in Korea. Also, we had already reported the clinical and mycological studies of superficial fungal diseases (Ⅰ-Ⅶ)(July 1978 to June 1992)[3-9].

Consequently this report analyzes the clinical and mycological aspects of superficial fungal diseases during the period from July 1992 to June 1994 and compares it with our previous reports as well as similar studies of others.

PATIENTS AND METHODS

A total of 2,115 out-patients with clinical evidence of superficial fungal diseases visiting Department of Dermatology, University Hospital and Yongsan Hospital, College of Medicine, Chung Ang University from July 1992 to June 1994 were reviewed in detail.

The age, sex, monthly and regional distributions of superficial fungal diseases as well as coexisting fungal infections were recorded.

Specimens were obtained from patients diagnosed clinically as having superficial fungal diseases by scraping the infected sites. The scrapings, except those from patients with tinea (T.) versicolor, were cultured on Sabouraud's glucose agar media containing chloramphenicol, penicillin, and streptomycin. The scraped materials were treated with 10% potassium hydroxide(KOH) solution and examined under the light microscope for confirmation of hyphae and spores of fungi.

All culture plates were incubated at room temperature and examined at weekly intervals. Negative cultures were discarded after 6 weeks. Positive cultures were identified by gross and microscopic morphology.

Whenever necessary, 1% corn meal dextrose agar media were also used to aid in identification.

RESULTS

1) Clinical results

The incidence of superficial fungal diseases to total number of new out-patients(8,048) was 26.3%(2,115 cases).

Among 2,115 there were 1,478 male and 637 female patients. Therefore the ratio of male to female was 2.3:1(Table 1). Table 1 represented age distribution of patients with superficial fungal diseases which showed high incidence in fourth (22.3%), third(22.2%), and fifth decade(17.9%). Especially the sex ratio of patients with T. cruris, which was the most prominent disease showing male predominance, was 15.9:1(Table 2).

The monthly prevalence was highest in July (16.5%), followed by June(13.1%), and August(12.3%). Therefore approximately 41.9% of superficial fungal diseases developed in these three months with hot and humid weather.

Among 2,115 cases of superficial fungal diseases, T. pedis that revealed 21.4% was the

Table 1. Age and sex distribution

Age \ Sex	Male(%)	Female(%)	Total(%)
0 – 9	130(8.7)	69(10.3)	199(9.4)
10 – 19	99(6.8)	23(3.6)	122(5.8)
20 – 29	328(22.2)	141(22.1)	469(22.2)
30 – 39	330(22.3)	142(22.3)	472(22.3)
40 – 49	259(17.5)	119(18.7)	378(17.9)
50 – 59	210(14.2)	80(12.6)	290(13.7)
60 – 69	70(4.7)	31(4.9)	101(4.8)
70 – 79	44(3.0)	32(5.0)	76(3.6)
80 – 89	8(0.5)	0(–)	8(0.4)
Total(%)	1478(100)	637(100)	2115(100)

Table 2. Sex distribution in each superficial fungal infection

Disease \ Sex	Male	Female	Total
T. pedis	316	136	452
T. manus	56	52	108
T. unguium	146	135	281
T. cruris	350	22	372
T. corporis	199	86	285
T. capitis	20	20	40
T. versicolor	172	32	204
Candidiasis	219	154	373
Total	1478	637	2115

T. : Tinea.

most common. The second most frequent disease was T. cruris(17.6%) and candidiasis (17.6%), followed by T. corporis(13.5%), T. unguium(13.3%), T. versicolor(9.6%), T. manus (5.1%), and T. capitis(1.9%) (Table 3).

There were 426 cases(20.1%) of coexisting fungal infections. Of the coexisting fungal infections of T. pedis accounted for 34.4%, followed by T. unguium(26.5%), T. manus(14.3%), T. cruris(12.7%), T. corporis(8.2%), T. capitis, candidiasis, and T. versicolor accounted for the remaining 3.9%. Especially the coexisting cases of T. pedis with T. unguium were most common(Table 4).

2) Mycological results

Both KOH preparations and fungal culture were done for the diagnosis of clinically suspected superficial fungal diseases except T. versicolor. Of the 1,911 KOH preparations, 1,096(57.4%) were positive for the presence of hyphae or spores. Of these 675(61.6%) yielded positive cultures for superficial fungal infections while in 271(24.7%) cultures were negative and in 150(13.7%) were contaminated. The negative rate of KOH scraping was 42.6% (815). However, of these 254(31.2%) yielded positive cultures. Hence, the total positive culture were in 929(48.6%). The positive rate of direct KOH examination revealed 67.2% in T. cruris followed by candidiasis(62.2%), T. corporis (60.4%), T. pedis(54.4%), T. capitis(47.5%), T. unguium(46.6%), and T. manus(42.6%)(Table 5). There were contaminants in 235(12.3%) of 1,911 cultured specimens.

Table 6 illustrates the comparison of cultured fungi with KOH scraping in each superficial fungal disease. Approximately 39.1% (363 strains) of culture positive specimens grew *Trichophyton(T.) rubrum*. The second most frequent isolate was *Candida* species(34.6%, 321 strains), followed by *T. mentagrophytes*(23.0%, 213 strains), *Microsporum(M.) canis*(2.0%, 19 strains), *Epidermophyton(E.) floccosum*(1.2%, 11 strains), and *T. ferrugineum* (0.2%, 2 strains).

In comparison to our previous studies, positive culture rate is higher than Ⅱ-Ⅶ[4-9], and lower than Ⅰ[3](Table 7). Table 8 illustrates the comparison of cultured fungi in present study with our previous studies[3-9]. The most common isolate of present study was *T. rubrum* as in Ⅲ[5], Ⅴ[7], Ⅵ[8], Ⅶ[9]. The second most common isolate of present study was Candida species which was the most frequent isolate in Ⅰ[3], Ⅱ[4], Ⅳ[6].

Table 3. Monthly distribution of each superficial fungal infection

Disease \ Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total(%)
	44	19	20	31	75	66	76	56	28	13	8	16	452(21.4)
T. manus	4	4	7	18	21	14	5	7	7	5	7	9	108(5.1)
T. unguium	19	20	14	18	15	33	42	37	36	7	18	22	281(13.3)
T. cruris	21	23	18	22	20	36	76	52	43	8	23	30	372(17.6)
T. corporis	17	7	18	35	34	15	39	43	12	14	27	24	285(13.5)
T. capitis	2	2	2	6	6	4	6	0	2	3	4	3	40(1.9)
T. versicolor	8	4	4	16	12	48	28	32	20	24	4	4	204(9.6)
Candidiasis	17	25	13	16	27	61	76	34	31	25	33	15	373(17.6)
Total(%)	132 (6.2)	104 (4.9)	96 (4.5)	162 (7.7)	210 (9.9)	277 (13.1)	348 (16.5)	261 (12.3)	179 (8.5)	99 (4.7)	124 (5.9)	123 (5.8)	2115 (100)

T. : Tinea.

Table 4. Coexisting infection

CFI * \ Disease	T. pedis	T. manus	T. unguium	T. cruris	T. corporis	T. capitis	T. versicolor	Candi-diasis	Total (%)
	*	67	167	38	15	1	2	3	293
T. manus	67	*	31	11	10	1	0	2	122
T. unguium	167	31	*	17	7	3	0	1	226
T. cruris	38	11	17	*	34	0	5	3	108
T. corporis	15	10	7	34	*	4	2	2	74
T. capitis	1	1	3	0	4	*	0	0	9
T. versicolor	2	0	0	5	2	0	*	0	9
Candidiasis	3	2	1	3	2	0	0	*	11
Total(%)	293 (34.4)	122 (14.3)	226 (26.5)	108 (12.7)	70 (8.2)	13 (1.5)	9 (1.1)	11 (1.3)	852 (100)

CFI*: Coexisting fungal infection, T. : Tinea.

DISCUSSION

The geographic distribution and prevalence of superficial fungal disease are not static but change under the influence of various factors such as climate, migration of people, and development in prophylaxis and therapy. Therefore the continuous studies of the clinical and mycological aspects of superficial fungal infections according to the economic and environmental changes are necessary.

Since 1959 when Suh[2] first reported the nationwide study of fungal diseases, many studies on the clinical and mycological aspects of superficial fungal infection have been reported in Korea[10-13]. Also we have already reported the clinical and mycological studies of superficial fungal diseases(Ⅰ -Ⅶ)[3-9]. Though patients with superficial fungal infection are not debilitating or fatal, superficial fungal diseases are one of the most prevalent dermatoses in Korea[14].

In present study, the incidence of superficial fungal diseases to total number of new out-patients was 26.3%, which was higher than 15.3%

Table 5. Comparison of KOH examination with culture and contaminaton in each superficial fungal disease

Diseases	Total number	KOH(+)			KOH(−)			KOH(+) (%)	KOH(−) (%)	*CT(%)
		Culture (+)	Culture (−)	*CT	Culture (+)	Culture (−)	*CT			
T. pedis	452	141	62	43	33	143	30	246(54.4)	174(38.5)	73(16.2)
T. manus	108	21	17	8	25	29	8	46(42.6)	46(42.6)	16(14.8)
T. unguium	281	53	48	30	18	118	14	131(46.6)	71(25.3)	44(15.7)
T. cruris	372	148	63	39	53	55	14	250(67.2)	201(54.0)	53(14.2)
T. corporis	285	86	64	22	15	92	6	172(60.4)	101(35.4)	28(9.8)
T. capitis	40	11	5	3	4	14	3	19(47.5)	15(37.5)	6(15.0)
Candidiasis	373	215	12	5	106	25	10	232(62.2)	321(86.1)	15(4.0)
Total(%)	1911	675	271	150	254	476	85	1096(57.4)	929(48.6)	235(12.3)

*CT: Contamination, T.: Tinea.

Table 6. Cultured fungi in each superficial fungal disease

Disease \ Cultured strain	*T. rubrum*	*T. menta.*	*T. ferrugineum*	*M. canis*	*E. flo.*	Candida species	Total
T. pedis	114	57	0	2	1	−	174
T. manus	31	14	0	1	0	−	46
T. unguium	43	28	0	0	0	−	71
T. cruris	123	72	0	1	5	−	201
T. corporis	51	40	0	5	5	−	101
T. capitis	1	2	2	10	0	−	15
Candidiasis	0	0	0	0	0	321	321
Total(%)	363 (39.1)	213 (23.0)	2 (0.2)	19 (2.0)	11 (1.2)	321 (34.6)	929 (100)

T.:Trichophyton, T. menta. : Trichophyton mentagrophytes, M.: Microsporum, E. flo.: Epidermophyton floccosum, T.: Tinea.

−25.4% of our previous reports[3-9], 22.4% of Rhim et al[11], 13.3% of Kim et al[12], and 5.1% of Min et al[13]. The possible reasons for the increase in the incidence can be explained as follows: the differences in the scope and design of the investigations; rise in room temperature according to the elevation of standard of living; relative decrease of other infectious diseases; increase of life span by virtue of advancement in medical science; the trend to visit dermatologic clinic more frequently for the management of fungal diseases after the extensive application of medical care insurance; or there may be true differences in the populations.

In sex distribution, there were 1,478 male and 637 female patients. Therefore the ratio of male to female was 2.3:1. Especially the sex ratio of patients with T. cruris, which was the most prominent disease showing male predominance, was 15.9:1(Table 2). It is well known that T. cruris is more common in men and rarely involves women. This is a result of unique characteristics of male crural area that prevents evaporation of an increased local sweating. Other factors such as T. pedis which can be the cause of T. cruris is more prevalent in men and the differences in costume between men and women also contribute.

Age distribution showed high incidence in

Table 7. Comparison of positive rate(%) of KOH examination and culture with previous reports

(Year)	I (1979)	II (1981)	III (1983)	IV (1985)	V (1987)	VI (1989)	VII (1992)	Present report (1994)
KOH exam	76.5	66.6	59.3	62.5	66.8	57.3	54.0	57.4
Culture	56.8	40.1	39.5	40.2	46.5	36.3	42.7	48.6
CT*	18.2	13.5	24.2	18.4	16.1	11.8	12.7	12.3

CT* : Contamination.

Table 8. Comparison distribution(%) of cultured fungi with previous reports

(Year)	I (1979)	II (1981)	III (1983)	IV (1985)	V (1987)	VI (1989)	VII (1992)	Present report(1994)
T. rubrum	22.2	30.1	54.1	29.6	38.0	43.2	38.4	39.1
T. mentagrophytes	10.6	19.6	5.8	28.2	24.4	9.5	23.6	23.0
M. canis	–	0.2	–	1.1	1.3	9.4	0.7	2.0
E. floccosum	5.7	1.7	0.4	1.4	1.4	1.2	0.2	1.2
T. ferrugineum	0.6	0.5	6.2	0.2	0.4	0.2	0.3	0.2
Candida species	42.3	47.9	33.5	39.5	34.5	36.5	36.9	34.6

T.: Trichophyton, M.: Microsporum, E.: Epidermophyton.

fourth(22.3%) and third (22.2%), and fifth decade(17.9%). The patients between these age groups made up 62.4%. This is similar to our previous reports and other reports. People in these age group are energetic in social and physical activity and have more chance to offer favorable condition for the fungal proliferation because of more sweating.

The monthly prevalence of superficial fungal diseases was high in July(16.5%), June(13.1%), and August(12.3%). Therefore approximately 41.9% of superficial fungal diseases developed in these months with hot and humid weather. But in cold season such as December, January, February showed similar monthly prevalence to the remaining 5 months. This suggests that high temperature and humidity are the most important precipitating factors.

Before the 1960s, T. capitis was very prevalent because of poor economic and hygienic status[10]. Thereafter T. pedis and T. cruris were the most prevalent among the superficial fungal diseases according to the improvement of economic, environmental and hygienic states. Kim[10] reported in 1971 that the incidence of T. pedis and T. manus was 45.1%; T. cruris, 34.8%; T. corporis, 12.4%; which were similar to the results of other reports[11,13] and our previous studies[3-9]. Therefore T. pedis as well as T. cruris and T. corporis are highly prevalent in Korea. Otherwise T. capitis is gradually decreased and recently it rarely develops[15]. In present study T. pedis was also the most common which revealed 21.4%. The second most frequent disease was T. cruris(17.6%) and candidiasis(17.6%), followed by T. corporis(13.5%), T. unguium(13.3%), T. versicolor(9.6%), T. manus(5.1%), and T. capitis(1.9%).

Superficial fungal infections commonly involve more than one site of body. Chun et al[16] and Kim & Lee[17] reported that concurrent infection of dermatophytoses is frequently caused by autoinoculation from one part to another. But Lee & Kim[18] hypothesized that coexisting superficial fungal infections were often independent. According to Chun et al[16], most

common concurrent fungal infections were T. pedis with T. manus. Kim & Lee[17] and Lee & Kim[18] reported that concurrent infection of T. pedis with T. cruris was the most common. But, present study as well as our previous studies[5-9] showed that the case of T. pedis with T. unguium was the most common. Of coexisting fungal infections, T. pedis with other superficaial fungal infections was the most common which accounted for 34.4% in this study. Present result is similar to other reports[16,17,18] and our previous studies[4-9].

The direct KOH examination is easy to perform, very economical, and highly reliable. It is probably the most convenient test in the diagnosis of superficial fungal infections of the skin[19]. The most common causes of failure of this examination are insufficient amount of scraped materials; secondary infection; a mosaic pattern of intercellular spaces being taken for hyphae; and pollen, hair, air bubbles, or foreign fibers being taken for spores or hyphae. In present study, the rate of positive KOH examination was 57.4%. It is similar to our previous study Ⅲ[5], Ⅵ[8], Ⅶ[9], and lower than Ⅰ[3], Ⅱ[4], Ⅳ[6], Ⅴ[7] (Table 7). Especially Min et al[13] reported that the rate of positive KOH examination was 91.8%. The difference in the positive rate of direct KOH examination may be accounted for the inadequate specimen, the previous topical application, or ingestion of antifungal agents before examination.

The rate of positive KOH examination was highest in T. cruris (67.2%), followed by candidiasis(62.2%), T. corporis(60.4%), T. pedis (54.4%), T. capitis(47.5%), T. unguium(46.6%), and the lowest in T. manus(42.6%). The rate of positive culture was highest in candidiasis (86.1%), followed by T. cruris(54.0%), T. manus (42.6%), T. pedis(38.5%), T. capitis(37.5%), T. corporis(35.4%), and the lowest in T. unguium (25.3%). Failure of culture is frequently due to the lack of enough material inoculated into the culture medium. In *T. unguium* the rate of positive culture is low as shown in present study that was 25.3%, because of difficulty to obtain infected material. To increase the positive rate of culture for *T. unguium*, Hwang and Suh[20] devised the new file method.

Culture results are more specific but are not as sensitive as direct KOH examination of scrapings. The likelihood of recovering fungi increases when more than one culture is taken. It is advisable that cultures be taken at the time that a KOH examination is performed. The rate of positive cultures was 48.6% in this study. In comparison to our previous studies, it is higher than Ⅱ-Ⅶ[4-9], but lower than Ⅰ[3](Table 7). And it is also higher than that of Min et al[13].

Most prevalent species of fungi isolated in superficial fungal infections differ strikingly from one geographic locality to another and change often decade to decade. In this study, T. rubrum was the most common organism isolated, which grew in approximately 39.1% of culture positive specimens. It confirmed previously reported trends of the increased incidence of infections due to the most frequently encountered dermatophyte, *T. rubrum*[5,7-9,10-13]. Although *T. rubrum* was most frequently isolated in superficial fungal infections, Candida species, *T. mentagrophytes, M. canis, E. floccosum,* and *T. ferrugineum* were also isolated.

The isolates in each superficial fungal disease were as follows: in T. pedis, T. *rubrum* (114 strains), *T. mentagrophytes*(57 strains), *M. canis*(2 strains), and *E. floccosum*(1 strain); in T. cruris, *T. rubrum*(123 strains), *T. mentagrophytes*(72 strains), *E. floccosum*(5 strains), and *M. canis*(1 strain); in T. corporis, *T. rubrum*(51 strains), *T. mentagrophytes*(40 strains), *M. canis*(5 strains), and *E. floccosum*(5 strains); in T. unguium, *T. rubrum*(43 strains) and *T. mentagrophytes*(28 strains); in T. manus, T. *rubrum*(31 strains), *T. mentagrophytes*(14 strains), and *M. canis*(1 strain); and in T. capitis, *M. canis*(10 strains), *T. mentagrophytes*(2 strains), *T. ferrugineum*(2 strains), and *T. rubrum*(1

strain) respectively.

Table 8 illustrates the comparison of cultured fungi in present study with our previous studies[3-9]. The most common isolate of present study was *T. rubrum* as in Ⅲ[5], Ⅴ[7], Ⅵ[8], Ⅶ[9]. The second most common isolate of present study was *Candida* species which were the most frequent isolate in Ⅰ[3], Ⅱ[4], Ⅳ[6]. *M. canis* has increased gradually, and Suh et al21 reported the increased prevalence of *M. canis* infections. The great majority of T. pedis and T. manus were caused by *T. rubrum* and *T. mentagrophytes* in this study. It is similar to the report by Choi et al[22] and our previous studies Ⅰ[3], Ⅱ[4], Ⅳ[6], Ⅴ[7], Ⅵ[8], Ⅶ[9]. But Lee et al[5] was unable to isolate T. *mentagrophytes* in T. manus.

The major causative agents of T. cruris in present study were *T. rubrum* and *T. mentagrophytes*. It is identical to the report by Won et al[23]. *E.floccosum*, which was rarely isolated, was exclusively isolated from T. cruris and T. corporis.

In T. corporis, T. *rubrum* was most frequently isolated. And *T. mentagrophytes, M. canis*. and *T. ferrugineum* were also isolated. *M. canis* was found exclusively in T. capitis and T. corporis, and was the major causative agent of T. capitis. Since Kim and Suh[24] reported the cat and human infections from *M. canis* in 1977, the incidence of *M. canis* among the patients with T. corporis and T. capitis seems to be increasing in Korea[25,26]. However the authors could not observe significant increase of *M. canis* in T. corporis which was similar to the report by Song et al[27].

Candida species were isolated in candidiasis in present study. Kim et al[28] reported the isolation and identification of *Candida* species in superficial fungal diseases. According to his report among the superficial fungal diseases in which *Candida* species grew in Sabouraud's glucose agar medium, T. pedis was the most common followed by candidiasis, T. cruris, onychomycosis, T. manus, and T. corporis. In the instance that *Candida* species are isolated in other superficial fungal infections except candidiasis, it is difficult to decide whether this is candidiasis or not. Hong et al[29] considered that the isolation of *Candida* species in other superficial fungal infections was due to secondary infection of *Candida* species or the reflection of high incidence of *Candida* species as normal flora in intertrigenous area. Authors thought that some of the dermatophytoses might be true candidiasis which was misdiagnosed before the growth of *Candida*.

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=국문초록=

표재성 피부진균증의 임상적 및 균학적 관찰(제8보)

중앙대학교 의과대학 피부과학교실

한은실 · 서성준 · 김명남 · 홍창권 · 노병인

표재성 피부진균증은 피부과 영역에서 빈번하게 발생되는 감염성 질환으로서 생활환경, 지역적 특성 및 시대적 변화 등의 여러 가지 주위 환경에 따라 임상 양상이나 균주에 변화를 보인다. 저자들은 이미 1보에서 7보까지를 통하여 피부진균증에 대하여 관찰한 바 있으며, 1992년 7월부터 1994년 6월까지 중앙대학교 의과대학 부속병원 피부과에 내원한 표재성 피부진균증 환자에 대한 임상적 및 균학적 관찰을 시행하여 다음과 같은 결과를 얻었다.

1. 표재성 피부진균증 환자는 2,115명으로 총 8,048명의 신환자중 26.3%를 차지하였다.
2. 연령별로는 30대가 22.3%로 가장 많았으며, 20대가 22.2%, 40대가 17.9%의 순이었다.
3. 남녀비는 2.3:1로 남자에서 많이 발생하였으며, 특히 완선에서는 15.9:1로 남자가 현저히 많았다.
4. 월별 발생빈도를 보면 7월 16.5%, 6월 13.1%, 8월 12.3%로 여름철에 주로 발생하였다.
5. 질환별 발생빈도는 족부 백선(21.4%), 완선(17.6%), 칸디다증(17.6%), 체부 백선(13.5%)의 순이었다.
6. 중복감염은 426명(20.1%)에서 관찰할 수 있었으며, 이중 족부 백선과 조갑 백선의 중복감염이 가장 많았다.
7. KOH 직접 도말 검사의 양성율은 57.4%, 균주의 배양율은 48.8%였다.
8. 균주의 출현 빈도는 *Trichophyton(T.) rubrum*(39.1%), *Candida species*(34.6%), *T. mentagrophytes*(23.0%)의 순이었다.