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UNUSUALLY HIGH ISOLATION FREQUENCY OF *EPIDERMOPHYTON FLOCCOSUM* FROM LESIONS OF DERMATOPHYTOSIS IN IZUMO CITY AND ITS VICINITY

(Dermatophytosis /*Epidermophyton floccosum*)

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Dermatophytes were isolated from lesions of dermatophytosis in the Izumo City and its vicinity, Japan. From the 106 lesions, 107 strains were isolated. Among the isolates from each type of dermatophytosis as well as among the whole isolates, the most frequently isolated dermatophytes were *Trichophyton rubrum* or *Trichophyton mentagrophytes*. *Epidermophyton floccosum* was also a frequent dermatophyte both among the whole isolates and among the isolates from each type of dermatophytosis. This high isolation frequency of *Epidermophyton floccosum* is unusual.

The epidemiology of dermatophytes in dermatophytosis has been studied throughout the world including Japan. The studies on the isolation frequencies of different species of dermatophytes from dermatophytosis have shown that the frequency of *Trichophyton rubrum* is the highest; it is followed by that of *Trichophyton mentagrophytes* (1,2). The frequencies of the other

dermatophytes including *Epidermophyton floccosum* were low. However, the isolation frequency of each species of dermatophytes was shown to differ occasionally according to the area where the studies were performed (3). The epidemiology of dermatophytes in the Izumo area of Japan has not been investigated until now. In the present study, we examined isolation frequencies of different species of dermatophytes from the lesions of different types of dermatophytosis in this district.

MATERIALS AND METHODS

When patients suspected of having dermatophytotic lesions were seen in our dermatological clinic, scrapings from the involved skin or nails or from the involved hairs were examined microscopically for elements of dermatophytes using a solution composed of 20% KOH and 50% Parker Quink (4). If elements of dermatophytes, especially their hyphae, were found in the specimen, the scrapings or hairs were cultured on Sabouraud's dextrose agar plates containing 50 μg/ml of chloramphenicol (Sankyo Co., Tokyo) and 500 μg/ml of cycloheximide (Sigma Chemical Co., St. Louis) at room temperature for 4 weeks (3). The colonies grown on the plates were then observed. When the fungal colonies grew, slide cultures were performed (5). A small part of a fungal colony was inoculated upon a small cubic thin Sabouraud's dextrose agar medium containing chloramphenicol and cycloheximide, which was then covered with a cover slip. After incubation in a humid chamber at room temperature for a few days, the fungal elements grown on the agar medium were observed microscopically. The species of dermatophyte was determined by the characteristic features of the colony on the agar plate and of the fungal elements on the slide culture.

In the present investigation, we studied patients with dermatophytotic lesions which were proved to be carrying dermatophytes, who were seen in our dermatological clinic during the period between May 22 and November 22, 1985. The patients studied were residents of the Izumo City and its vicinity which is the eastern area of Shimane Prefecture, Japan; one patient not living in the Izumo City and its vicinity was included.

RESULTS

The number of patients with dermatophytosis studied in the present study was 176; 95 males and 81 females. One hundred thirty four patients had only one type of dermatophytotic lesion, 42 patients had more than one type of lesion. In total, 229 different types of lesions were examined (Table 1).

Table 1. Incidence of different regional types of dermatophytosis

Regional types	Numbers of patients (%)
Tinea faciei	10 (4.4)
Tinea manus	17 (7.4)
Tinea corporis	20 (8.7)
Tinea cruris	33 (14.4)
Tinea scroti	2 (0.9)
Tinea pedis	96 (41.9)
Tinea unguium	51 (22.3)
Total	229 (100)

Table 2. Isolation frequencies of dermatophytes from different types of dermatophytosis

Regional types	Numbers of positive cultures
Tinea faciei	5/10 (50.0)
Tinea manus	9/17 (52.9)
Tinea corporis	15/20 (75.0)
Tinea cruris	24/33 (72.7)
Tinea scroti	1/2 (50.0)
Tinea pedis	39/96 (40.6)
Tinea unguium	14/51 (27.5)
Total	107/229 (46.7)

Table 3. Numbers of strains of different species of dermatophytes isolated from different types of dermatophytosis

Regional types	*Trichophyton rubrum*	*Trichophyton mentagrophytes*	*Trichophyton violaceum*	*Epidermophyton floccosum*	Undetermined	Total
Tinea faciei	2 (40.0)			2 (40.0)	1	5
Tinea manus	6 (66.7)	1 (11.1)		2 (22.2)		9
Tinea corporis	8 (53.3)	1 (6.7)		5 (33.3)	1	15
Tinea cruris	15 (62.5)	3 (12.5)		6 (25.0)		24
Tinea scroti	1 (100)					1
Tinea pedis	16 (41.0)	15 (38.9)	1 (2.6)	6 (15.4)	1	39
Tinea unguium	3 (21.4)	4 (28.6)		2 (14.3)	5	14
Total	51 (47.7)	24 (22.4)	1 (0.9)	23 (21.5)	8	107

Table 2 shows the isolation frequencies of dermatophytes from different types of dermatophytosis. The highest frequency was obtained from tinea corporis lesions (75.0%), and the lowest from tinea unguium lesions (27.5%). The average frequency was 46.7%.

In Table 3, the number of each species of dermatophytes isolated from different types of dermatophytosis is shown. Two strains of dermatophytes, *Trichophyton rubrum* and *Trichophyton mentagrophytes*, were isolated from one lesion of tinea pedis. From each of the other lesions, only one strain was isolated. The 107 strains of dermatophytes isolated in the present study were composed of 51 strains of *Trichophyton rubrum*, 24 of *Trichophyton mentagrophytes*, 23 of *Epidermophyton floccosum*, 1 of *Trichophyton violaceum* and 8 of dermatophytes of undetermined species. The most frequent isolates from each type of dermatophytosis were

Trichophyton rubrum or *Trichophyton mentagrophytes*. The second and third most frequent isolates from any type of dermatophytosis except tinea scroti were *Epidermophyton floccosum* which comprised 14.3-40.0% of the isolates.

DISCUSSION

In many reports from various countries including Japan, lesions of dermatophytosis had a tendency to carry *Trichophyton rubrum* most frequently (approximately 75%), and it was followed by *Trichophyton mentagrophytes* (approximately 20%) (2, 6-9). The remainder was shared by some other species of dermatophytes including *Epidermophyton floccosum*. As for the isolation frequency of each species of dermatophytes from different types of dermatophytosis, *Trichophyton rubrum* was shown also to be isolated most frequently from the lesions of any type of dermatophytosis except tinea capitis (1, 6, 10, 11). The isolation frequency of *Trichophyton mentagrophytes* followed that of *Trichophyton rubrum*. *Epidermophyton floccosum* was not frequently isolated from the lesions of any type of dermatophytosis. However, some authors have reported that this species of dermatophytes was isolated from the lesions of tinea cruris fairly frequently (up to 31%) (12). They have also reported that from the other types of dermatophytosis, however, only a few or no strains of *Epidermophyton floccosum* were isolated . In the present study, *Epidermophyton floccosum* comprised 21.5% of the whole dermatophytes isolated from the lesions (Table 3). This frequency is unusually high. As for each type of dermatophytosis, *Epidermophyton floccosum* comprised 25.0% of isolates from the lesions of tinea cruris (Table 3). This frequency is nearly the highest among the reported isolation frequencies of *Epidermophyton floccosum* from tinea cruris lesions. The isolation frequency of this species of dermatophytes from the lesions of any type of dermatophytosis other than tinea cruris was much higher than the reported frequency elsewhere (Table 3). These results are very characteristic in the present study. It can be speculated that the epidemiology of dermatophytes in dermatophytotic lesions in the Izumo City and its vicinity is different from those of the other areas.

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REFERENCES

1) Cabrota, J., Esteves, J. and Sequeira, H. (1983/1984) Dermatophytes in Portugal (1972-1981). Mycopathologia, 84, 159-164
2) Alteras, I. and Lehrer, N. (1977) A critical survey of 1000 cases of dermatophytosis in the Tel Aviv area during 1970-1975. Mycopathologia, 62, 121-124
3) Egere, J.U. and Gugnani, H.C. (1982) Etiology of dermatophytosis in Eastern Nigeria: A 7 year study. Mykosen, 25, 178-181
4) Roberts, S.O.B. and Mackenzie, D.W.R. (1979) Mycology. in: Textbook of Dermatology, 3rd ed. (Rook, A., Wilkinson, D.S. and Ebling, F.J.G. ed.) p. 771, Blackwell, Oxford, London, Edinburgh and Melbourne
5) Ferguson, J.S. Jr. and Prazan, G. (1960) The slide culture. Arch. Dermatol., 81, 974-977
6) Khan, M.Q., Buch, B.M., Dabhi, B.J., Karelia, L.S. and Tilak, S.S. (1978) Dermatophytoses in Jamnagar. J. Indian Med .Assoc., 70, 8-11
7) Hara, Y. and Tsuboi, H. (1976) Dermatophytic flora of Hiroshima. Nishinihon J. Dermatol., 38, 941-945 (in Japanese)
8) Urabe, H. and Honbo, S. (1980) Dermatophytosis in Kyushu District. Jpn. J. Med. Mycol., 21, 221-226 (in Japanese)
9) Nishiyama, K., Asagami, C., Nishioka, K., Hamanaka, K. and Fujita, H. (1984) Clinical and statistical survey on dermatophytosis during the past 20 years. Nishinihon J. Dermatol., 46, 55-61 (in Japanese)
10) Rikimaru, M. (1969) Statistical survey of dermatomycosis. Nishinihon J. Dermatol., 31, 405-410 (in Japanese)
11) Iwatsu, T., Yanagida, M., Kariya, H. and Okamoto, S. (1976) Statistical survey of dermatomycoses at Dermatological Clinic of Chiba University Hospital for the last ten years. Nishinihon J. Dermatol., 38, 96-102 (in Japanese)
12) Khan, K.A. and Anwar, A.A. (1969) The etiology of tinea cruris in Karachi. Br. J. Dermatol., 81, 858-860