

Plantar *Trichophyton rubrum* Infections May Cause Dermatophytids on the Hands

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Over a 2-year period, we saw 37 patients with a diagnosis of dermatophytid on the hands based on 1) culture-proven dermatophytosis on one or both feet; 2) symmetrical, secondary vesicular eruptions on the fingers and/or palmar aspects of the hands; and 3) a resolution in both areas of involvement after treatment of the dermatophytosis on the foot. During the study period, 128 patients had culture-proven dermatophytosis of the feet caused by *Trichophyton rubrum*. Nine of these (7%) developed dermatophytid. Seventy-eight patients had dermatophytosis of the feet caused by *Trichophyton mentagrophytes*. Twenty-seven of these (35%) developed dermatophytid. One of 6 patients infected on the feet with *Epidermophyton floccosum* developed dermatophytid. **Key words:** vesicular hand dermatitis; *Trichophyton mentagrophytes*; *Epidermophyton floccosum*.

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A symmetrical, non-infectious, secondary cutaneous eruption seen following a primary dermatophyte infection at another, distant site is called a dermatophytid. The secondary eruption is presumably due to sensitization to fungal antigens (1, 2). Similar *id* reactions can occur following eczema of the lower legs (3).

Kerion celsi caused by *Trichophyton verrucosum* commonly cause widespread dermatophytids. When this reaction is caused by inflammatory tinea pedis, it is usually seen on the hands as a vesicular pompholyx-like eruption (4-7).

In our private dermatological practice we have seen dermatophytids caused by *T. rubrum*. Finding this unusual, we conducted a retrospective study of the dermatophytids with a morphology of vesicular hand dermatitis seen over a 2-year period.

MATERIAL AND METHODS

From January 1, 1991, to December 31, 1992, we saw 37 patients who met the following criteria: 1) they had a primary eruption on one or both feet from which a dermatophyte was isolated by culture; 2) they had a symmetrical secondary eruption on the sides of the fingers and/or on the palms; and 3) treatment of the fungal infection on the feet was followed by resolution of the fungal infection as well as the secondary eruption. Sixteen of the 37 patients were men and 21 were women, ranging in age from 11 to 59 years with a mean of 31 years.

Six other patients met the above criteria except for the fact that, while fungal microscopy from the feet was positive on two separate occasions, it was not possible to culture the fungi. These patients were not included in the study.

Throughout the study period, fungal microscopy and culture was carried out as a routine procedure at Statens Seruminstitut (the Danish National Serum Institute). Microscopy for fungi was typically also performed by one of the authors at the first visit. Material for microscopy was taken from the feet. If there was scaling on the hands or bullous lesions, material was taken from the hands as well.

RESULTS

The number of patients with dermatophytid on the hands and the total number with dermatophytosis of the hands and feet are given in Table I. In most of the patients infected with *T. mentagrophytes* who developed dermatophytid, the plantar dermatophytosis was very inflamed, and some patients had bullous plantar lesions. In contrast to this, one woman had a discrete dermatophytosis on one big toe caused by *T. mentagrophytes* and an intense *id* reaction on both palms and the fingers of both hands. Most of the 9 patients infected with *T. rubrum* had widespread plantar dermatophytosis with sparse or no inflammation.

Twenty-seven of the 37 patients (73%) developed dermatophytid during the warmer months, from May to October.

Thirty-four patients had dermatophytid on the hands only; 21 had primarily palmar lesions, while 13 had primarily interdigital lesions. Three patients had secondary eruptions on the palms and soles; one of them also had lesions on the thighs.

For 32 patients, the morphology of the dermatophytid was an acute vesicular eruption. One had palmar and plantar vesicles and an erythema multiforme-like eruption on the thighs; one had vesicles and bullae. For 3 patients the dominant feature was circinate scaling of the palms and fingers with only a few vesicles. Two of these patients had plantar infections with *T. mentagrophytes*; one was infected with *T. rubrum*.

Two patients infected with *T. mentagrophytes* had severe aggravation of their secondary eruptions after the initiation of griseofulvin therapy. One patient developed bullae of the palms and soles, and the other developed papular lesions on both forearms.

The feet of 12 patients were treated with a topical antifungal agent, while the remainder were given systemic treatment, usually with griseofulvin in combination with a topical agent. The dermatophytid cleared in all patients, usually after 2-4 weeks.

In 155 of the 213 cases of dermatophytoses on the feet (73%), the infection was unilateral, while 25 (89%) of the 32 hand infections were unilateral.

DISCUSSION

Acute and recurrent vesicular eruptions on the palms and fingers were seen in 1% of all patients referred to one dermatology clinic (8). This non-specific dermatosis can have many causes, one of which is a dermatophytid (7). Most of the cases seen here occurred during the summer of 1992, an unusually hot summer in western Europe.

Sulzberger & Baer (1) set up the following requirements for a diagnosis of a dermatophytid: 1) a demonstrable focus of primary fungus infection on the feet or elsewhere; 2) onset of the

Table I. The number of patients seen in 1991 and 1992 with dermatophytid of the hands and the number with dermatophytosis of the hands or feet

	Dermatophytosis of the feet	Dermatophytid on the hands (% of dermatophytosis of the feet)	Dermatophytosis of the hands
<i>T. rubrum</i>	128	9 (7)	28
<i>T. mentagrophytes</i>	78	27 (35)	3
<i>E. floccosum</i>	6	1 (17)	1
<i>T. rubrum</i> + <i>T. mentagrophytes</i>	1	0 (0)	0
Total	213	37 (17)	32

eruption on the hands following activation or irritation of the primary focus; 3) the eruption on the hands has a symmetrical distribution and is found largely on the thenar and hypothenar eminences, the palms and the sides of the fingers; 4) the eruption on the hands subsides within a reasonable period after the primary fungus infection has cleared; and 5) a trichophytin skin test is positive.

We did not have access to validated trichophytin antigen. In the cases described here, the clinical picture was so characteristic that we did not consider an extra diagnostic test to be necessary.

The human defence system against dermatophytes includes a specific immune response seen particularly in acute and severe infections (9). Delayed-type hypersensitivity has been detected by means of the lymphocyte proliferation test and the trichophytin test (9). In another study, there was intense stimulation in the lymphocyte transformation test in patients with dermatophytosis and vesicular *id* reactions on the hands (10). The trichophytin test represents a delayed-type hypersensitivity reaction to dermatophyte antigen (2, 5, 11). Intradermal testing is the most common diagnostic method, but in one study, patch testing on partially stripped skin resulted in positive reactions in patients with vesicular or bullous dermatophytosis on the feet as well as in one patient with an *id* reaction (11).

Delayed-type hypersensitivity reactions have also been implicated in vesicular hand dermatitis in patients with positive patch tests to neomycin and other medicaments, balsams, and the metals, nickel, cobalt and chromate (12). Meneghini & Angelini (13) found delayed-type hypersensitivity reactions to contact allergens to be a far more important cause of these eruptions than were *id* reactions.

Id reactions associated with severe dermatitis, most com-

monly on the lower legs, are clinically similar to dermatophytids seen after infection with *T. verrucosum*. Activated, circulating *T*-lymphocytes have been detected in such patients (14, 15).

Nineteen of our 37 patients with dermatophytid reactions had unilateral dermatophytosis. The combination of a primary, inflamed eruption on one foot followed by a sudden vesicular eruption on both hands should raise a suspicion of dermatophytid and lead to further investigation. This is particularly true if the eruption occurs during the summer months. If *T. mentagrophytes* is isolated from the plantar lesions, the presence of a dermatophytid is very likely. Although rarely described, dermatophytids do also occur, however, in patients with *T. rubrum* infections with little or no inflammation (2).

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