

Experimental Inoculation of Dermatophytes on Psoriatic Skin

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Two dermatophytic agents, *Trichophyton rubrum* and *Trichophyton mentagrophytes* were used in the experimental inoculation of psoriatic lesions in 27 volunteer patients (13 males and 14 females with an age range from 17 to 72 yr). *T. rubrum* was inoculated in 14 patients and *T. mentagrophytes* (varietas *granulare*) in 13. For purposes of control in each patient the same agent was also inoculated on healthy skin. Results were noted once a week for a period of 1 mo. A positive response was found in 12 of the 14 patients inoculated with *T. rubrum* but only in 4 of the 13 inoculated with *T. mentagrophytes*. Healthy skin was found to have a positive response in only 5 cases, in 4 with *T. rubrum*, and in 1 with *T. mentagrophytes*. These results confirm the possibility of invasion of psoriatic lesions by dermatophytes and suggest that the coexistence of psoriasis and dermatophytic infection may be not always purely coincidental. The importance of the awareness of the presence of mycotic lesions and their possible spread with the application of steroid ointments under occlusive dressings in a psoriatic patient is stressed.

There have been only a very few reports of psoriasis associated with fungus infection, particularly with dermatophytes [1-3]. Apparently dermatophytes, which have a special affinity for the horny layer of the epidermis and keratinized structures, avoid the parakeratosis characteristic of psoriasis, but just why the dermatophytic invasion of a psoriatic lesion is so rare a finding *in vivo* remains to be elucidated. It has been suggested that when both diseases are present in the same individual they have developed separately, with no relationship between the psoriasis and the fungous infection [1]. In contrast, some authors have reported the increased growth of several types of fungi in *in vitro* studies of psoriatic scales and nails [4]. In view of these controversial opinions a study was planned to determine whether or not a number of common pathogenic dermatophytes are able to attack psoriasis skin *in vivo*.

MATERIALS AND METHODS

The patient material comprised 27 patients, 14 females and 13 males, aged from 17 to 72 yr who volunteered for the study. All patients were carefully examined for the possible presence of mycotic infections. Only 2 exhibited discrete fungal manifestations consisting of scaly-patchy lesions between the 4th and 5th toes due to *Candida albicans* in 1 and invasion of the toe-nails due to *Trichophyton rubrum* in the other.

Two agents were chosen for experimental inoculation of the psoriatic skin: *T. rubrum* and *T. mentagrophytes* (varietas *granulare*), each obtained from an active case of tinea pedis. The isolates were cultured on Sabouraud's glucose agar supplemented with Actidione 0.5 mg/ml and chloramphenicol 0.05 mg/ml for a period of 2 weeks. A few minutes prior to inoculation small amounts of the respective colonies were finely triturated on sterile glass. The inoculum thus obtained was deposited on a typical psoriatic lesion which had been slightly scarificated and was then covered with adhesive tape which was kept in place for at least 7 days before removal. For purposes of control inoculum of the

same agent was also deposited on healthy skin which had been previously scarificated in each patient. Observations were made once weekly during the period of 1 mo and notes on the clinical aspect of the lesions produced as well as mycological data were duly recorded. On each occasion specimens were taken for direct microscopic examination and culture. The inoculation was performed only if KOH treated specimens and culture, either from the psoriatic plaque or from the healthy skin, had been negative for the presence of fungi. An uninfected psoriatic plaque was early distinguished by its typical clinical aspect, with abundant imbricated micaceous scales, removal of which led to bleeding points. The response was considered positive only when an erythematous, scaly, sometimes slightly infiltrated plaque with vesicular borders, had formed at the site of inoculation and microscopic examination of scrapings and cultures had been found positive for fungi.

RESULTS

The results are summarized in the Table.

Among the 14 patients in whom *T. rubrum* was inoculated there was a positive response in 12 cases. During the first week after inoculation a small, red, slightly elevated spot appeared, the central part of which was covered with psoriasiform-like scales. During the second week the spot increased in size with a few occasional evanescent vesicles being formed at the margin, and in some cases a larger number of vesicles arising irregularly or in a ring just beyond the hyperemic and sometimes edematous margins. During the third and fourth weeks there was a tendency to extension in most patients and a topical antifungal drug was applied. In 1 case, a 54-yr-old female, there was extensive spreading of the typical tinea circinata lesions both on the psoriatic skin and adjacent healthy skin from 15 to 20 days after inoculation.

The experimental inoculation of *T. mentagrophytes* led to positive results on only 4 of the 13 patients inoculated with this agent. This was a surprising finding in view of reports by other authors of a greater success in inoculating the granular variety of this fungus than *T. rubrum*. There is no apparent explanation for this discrepancy beyond a possible susceptibility of these particular patients to invasion with *T. rubrum*. It should be noted that in almost all [3] of the patients the experimental lesions obtained with *T. mentagrophytes* healed spontaneously from 3 to 4 weeks after inoculation.

The healthy skin of these patients gave positive results in only 5 patients, in 4 cases with *T. rubrum* and in 1 with *T. mentagrophytes*.

It is worthwhile mentioning that in all the positive results the KOH direct microscopic examination of scrapings and culture were negative.

DISCUSSION

As noted above, there is some controversy as to the possibility of infection by fungi on psoriatic skin. Grupper and Avrame [1] reported finding a dermatophytic infection in a psoriatic patient. Pohler and Schönborn [2] found a *Microsporium gypsum* infection on the healthy glabrous skin in a female with psoriasis.

Our findings suggest that the association of psoriasis and fungus infection, particularly by dermatophytes, may not be such an exceptional coincidence as has been thought. Since parakeratosis may not be a favorable condition for invasion by dermatophytes, the chances for the occurrence of such organisms on a psoriatic plaque are quite small. With this in mind, the clinician who has made the initial diagnosis of psoriasis,

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	<i>Trichophyton rubrum</i>		<i>Trichophyton mentagrophytes</i>	
	Inoculation on psoriatic lesion	Inoculation on healthy skin	Inoculation on psoriatic lesion	Inoculation on healthy skin
Total				
PSORIATIC patients	14	14	13	13
Positive findings	12	4	4	1
Negative findings	2	10	9	12

even if he has not searched further for additional etiology, must also consider such extremely rare possibilities.

Of particular note is the fact that in 2 patients not included in this group typical tinea circinata lesions appeared on a

psoriatic plaque following the application of occlusive dressings with topical steroids. This gives rise to the thought that in psoriatic patients particular attention should be paid to even minor mycotic symptoms, and especially when *T. rubrum* is the causative organism, in view of the possibility of their spreading after such treatment has been administered.

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Annual Meeting of Society for Cutaneous Ultrastructure Research

The 1979 Annual Meeting of the Society for Cutaneous Ultrastructure Research (SCUR) will take place in the Faculty of Medicine, University of Barcelona, on June 7-9, 1979. The Meeting will be open to dermatologists, pathologists and biologists interested in human skin fine structure.

For further details and application forms please contact Professor J. M. Mascaro, Universidad de Barcelona, Escuela Profesional de Dermatologia y Venereologia, Barcelona, Spain. The closing date for applications will be January 31, 1979.