VIRULENCE OF TRICHOPHYTON MENTAGROPHYTES INFECTING STEROID-TREATED GUINEA PIGS

by

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ABSTRACT

The skin of steroid-treated and normal guinea pigs was inoculated with Trichophyton mentagrophytes and the clinical infection was observed. Organisms isolated from these two groups of animals were cultured on Mycosel® agar and inoculated into untreated guinea pigs to obtain a new infection. In vitro growth inhibition studies were also performed on these organisms using a tolnaftate disc. The character and duration of infection, colonial growth, new infection and tolnaftate inhibition were essentially the same for both the steroid-treated and control groups of animals.

INTRODUCTION

Patients on long-term corticosteroid therapy and patients with Cushing’s syndrome have exhibited an increased susceptibility to cutaneous fungal infection (1—4, 7, 11, 12). Two possible mechanisms to account for this phenomenon have been previously studied. Corticosteroids have been demonstrated to have no direct fertilizing effect on the in vitro growth of dermatophytes (6,13) and serum fungistatic activity, as measured by the retardation of dermatophyte growth in vitro, has been unaffected by endogenous or administered corticosteroids (8).

Animal passage of an attenuated strain of Trichophyton rubrum has been shown to produce some “rejuvenation” of the organism (14). An increase in the severity and duration of dermatophyte infection in corticosteroid-treated guinea pigs has been reported (9,10). The purpose of this study was to determine whether there is an increase in the virulence of dermatophytes causing cutaneous infection in animals that are receiving corticosteroids.

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MATERIALS AND METHODS

Organisms and inoculum
Trichophyton mentagrophytes from a stock culture was inoculated on modified Sabouraud’s agar containing chloramphenicol and cyclohexamide (Mycosel®) and grown at room temperature (25 °C). After twelve days of growth, the mycelial mat was removed, placed in 5 ml of Sabouraud’s broth, and pulverized into a uniform spore suspension. 0.75 ml of the spore suspension was used as the inoculum in each animal.

Primary infection
Twenty-four male albino guinea pigs, each weighing approximately 0.7 kg, were clipped and shaved over the right flank. The shaved skin was abraded with No. 1 grit sandpaper and the inoculum was rubbed into an area of 1 cm². Twelve guinea pigs were used as the test group and the remaining twelve as the control group.

Corticosteroid administration
Each of the twelve test animals received 30 mg/kg of triamcinolone acetonide by subcutaneous injection beginning one day post-inoculation of organisms and continuing daily (omitting weekends) for a total of twenty injections.

Observation of primary infection
Both groups of guinea pigs were observed for character, size and duration of infection. Scales and/or hair were cultured on Mycosel® plates and colonial size and morphology were recorded at intervals of three days.

New infection
Twelve new untreated male albino guinea pigs were inoculated with organisms isolated from six of the original steroid-treated animals and six of the control animals at the height of clinical infection (day 15). The procedures for preparation of inoculum, infection and observation were the same as those already described. In addition, the remainder of inoculum isolated from each animal was poured over Mycosel® agar in 9 cm Petri dishes so as to completely cover the medium. An 8 mm disc of No. 1 filter paper saturated with 1% tolnaftate was placed in the center of each dish and zones of growth inhibition were later measured.

RESULTS

Infection
The infection of guinea pig skin with Trichophyton mentagrophytes increased in a symmetrical manner over a one month period. Beginning with erythema and crusting of a small area, the infection