Onychomycosis in Children: Treatment Results of Forty-seven Patients

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Sir,

Onychomycosis is an uncommon disease in children, with a prevalence of less than 0.5% in Western countries (1–3). As in adults, *Trichophyton rubrum* is the most common dermatophyte cultured in the nails of children (1, 3, 4). To date, treatment of onychomycosis in children has been difficult because pharmaceutical companies have been reluctant to give instructions for treatment with the new antifungals. Few studies, mostly case reports, are available on the treatment of onychomycosis in children (3–7). We report a retrospective study on the treatment of onychomycosis in children with culture-positive dermatophyte infection of the nails.

PATIENTS AND METHODS

The study was performed at the outpatient dermatology clinic in Helsinki University Central Hospital between 1 January 1991 and 31 May 2000. All children under 18 years of age with culture-positive onychomycosis were included in the study. There were 29 boys and 28 girls; the mean age was 9.4 years. There were 14, 12, 19 and 12 patients in the 0–5, 6–9, 10–13 and 14–17-year age groups, respectively. Three of the patients had Down's syndrome, one diabetes mellitus with insulin treatment, one rheumatoid arthritis with methotrexate and oxychlorine treatment, one mucopolysaccharidosis with mental retardation and one ataxia with systemic steroid treatment. According to the interview, 17/57 patients had onychomycosis in their family.

The mean duration of onychomycosis was 2.7 years. Before their first visit at the dermatology clinic, 24 patients were treated for onychomycosis. Two patients received systemic treatment (1 griseofulvin, 1 itraconazole) and 22 patients only local treatment (11 amorolfine nail lacquer, 8 tioconazole 28% nail solution, 1 clotrimazole cream, 1 terbinafine cream and 1 patient both amorolfine nail lacquer and miconazole solution); none of the treatments were successful.

All the patients had distal subungual onychomycosis. The mean number of affected nails per patient was 3.9. Microscopy was performed in 34 patients and was positive in 29 cases. *Trichophyton rubrum* was cultured in 56 patients and non-specific *Trichophyton* species in one.

Of the 57 children treated by us at the dermatology clinic, 51 received systemic antifungal treatment; 27 patients received itraconazole for 2–4 months, 16 of them continuously and 11 as pulse therapy. The mean dose was 4 mg kg^{-1} day^{-1} in the continuous and 7 mg kg^{-1} day^{-1} in the pulse therapy group. Fourteen children were treated with terbinafine for 2–5 months, the mean dose was 4 mg kg^{-1} day^{-1}. Ten children received griseofulvin for 3–12 months, the mean dose was 10 mg kg^{-1} day^{-1}.

RESULTS

We re-examined the patients 1–9 years after treatment. Of the 57 children, 8 could not be traced and 2 were unwilling to participate; the actual number of children examined was therefore 47.

As can be seen from Table I, clinical cure was good in the itraconazole and terbinafine patient groups, while in the griseofulvin and local treatment groups the result was poor. The same trend can be seen in the mycological cure and total cure results. Of the 25 patients treated with itraconazole, 12/14 were totally cured with continuous therapy and 7/11 with pulse therapy. There was no statistical difference between these two itraconazole groups.

In most cases, the patients tolerated the medication well. One patient with itraconazole treatment had a mild increase in the values of transaminases during the treatment. The treatment was continued, however, and the patient was totally cured. One patient had ataxia, which worsened during itraconazole therapy; itraconazole was therefore discontinued. At the control visit, this patient had both clinical and mycological onychomycosis. Of the patients with Down's syndrome, one was cured both clinically and mycologically, but the other two were not. The patient with diabetes and those with rheumatoid arthritis and mucopolysaccharidoses were not cured at the control visit.

DISCUSSION

In adults, local treatment of onychomycosis is ineffective. In children, the nail plate is thinner than in adults, which may facilitate penetration of the drug (3).

Table I. Treatment results of onychomycosis in children at 1–9 years after medication

Treatment	Clinical cure n (%)	Mycologic cure		Total cure n (%)
		Microscopy n (%)	Culture n (%)	
Itraconazole	20/25 (80)	21/25 (84)	21/25 (84)	19/25 (76)
Terbinafine	9/13 (69)	10/13 (77)	10/13 (77)	8/13 (62)
Griseofulvin	1/4 (25)	1/4 (25)	1/4 (25)	1/4 (25)
Local only	0/5 (0)	1/5 (20)	1/5 (20)	0/5 (0)
Total	30/47 (64)	33/47 (70)	33/47 (70)	28/47 (60)

In some cases there has been clinical improvement of onychomycosis in children locally treated with terbinafine or ketoconazole cream (3). In adults, a strong 28% tioconazole solution was effective in 6 of 27 patients with fingernail infection (8), and amorolfine nail lacquer has been claimed to be effective in about 50% of patients with either toenail or fingernail onychomycosis (9). In onychomycosis, however, systemic medication is the treatment of choice in adults as well as in children. In toenail onychomycosis of children, terbinafine is used 4–5 mg kg^{-1} daily for 12 weeks, itraconazole 5 mg kg^{-1} daily either continuously or as pulse therapy for 12 weeks, fluconazole as pulse therapy 3–6 mg kg^{-1} daily one dose per week and griseofulvine continuously 10–13 mg kg^{-1} daily for 12–16 months (3).

In our study, none of the patients with local therapy and only one with systemic griseofulvin therapy were cured. In the itraconazole and terbinafine groups, 27 of 38 children were totally cured. Of the 11 not cured, 6 had some systemic disease; so, without them the treatment results with itraconazole or terbinafine would have been even better.

Our study indicates that the treatment results of onychomycosis with itraconazole or terbinafine in children are good, and better than in adults.

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CORRECTION

Tjioe M, Gerritsen MJP, Juhlin L and van de Kerkhof PCM: Treatment of vitiligo vulgaris with narrow band UVB (311 nm) for one year and the effect of addition of folic acid and vitamin B12. Acta Derm Venereol 2002; 82: 369–372. By mistake, the figures in this article were mixed-up. The correct position should be like this:

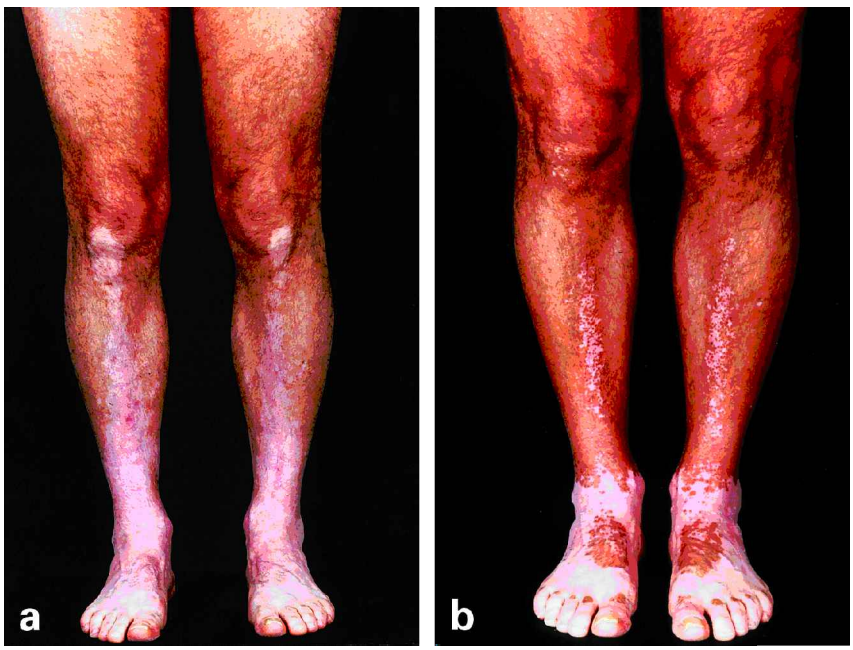

Fig. 2. Before (*a*) and after (*b*) photographs of a vitiligenous area on the lower legs and feet of a patient. Note the minimal repigmentation on the feet and ankles. Patient was treated with narrow band UVB alone. Photographs were taken with an interval of 12 months.