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Supervised Four-week Heliotherapy Alleviates the Long-term Course of Psoriasis

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The long-term effects of psoriasis heliotherapy were studied in a randomized cross-over trial with a 2-year follow-up. We allocated 95 patients randomly to receive a 4-week heliotherapy course, either at the onset or in the middle of the follow-up period. After a highly significant immediate alleviation of psoriasis about 50% of the patients still had a reduction of psoriasis 6 months later and about 25% one year later. A favourable carry-over treatment effect was still observed during the second follow-up year. Taking advantage of the cross-over design, the effect of heliotherapy was calculated to be statistically significant during the first follow-up year, and the apparent long-term alleviation of psoriasis after the heliotherapy was reflected in a significant period effect. The alleviation of psoriasis was accompanied by a significant decrease in the use of antipsoriatic treatments. ***Key words: Climatotherapy; Psoriasis therapy; Follow-up studies.***

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Sun-bathing in a suitable climate (heliotherapy) is a popular form of treatment for psoriasis in patients from North European countries. The immediate alleviating effect on psoriatic symptoms of 3–4 weeks of heliotherapy is quite evident and has been substantiated in several studies (1–5). However, since a relapse of the skin condition often occurs after a median period of only 80 days (5), the cost-benefit of heliotherapy trips might be questioned, unless longer-lasting advantages, such as decreased disease severity or reduced need for anti-psoriatic therapy, can be demonstrated. We have examined this question in a randomized trial with a cross-over design and a 2-year follow-up of 95 psoriasis patients.

METHODS

Patients and study design

Psoriasis patients of working age with a mild to severe condition were referred to the study by dermatologists from various parts of Finland. Inclusion criteria included a minimum disease duration of 2 years and previous experience of alleviation of skin symptoms during natural or artificial ultraviolet (UV) exposure. Exclusion criteria included sun-sensitive skin type I (6) and diseases incompatible with long-distance travel or southern climatic conditions. A total of 106 eligible patients, 70 men and 36 women, were randomized into two groups, G1 and G2, of equal size. The randomization was carried out in blocks of 2 patients in order of the arrival of their applications. Eleven patients, 5 in group G1 and 6 in group G2, withdrew before entering heliotherapy, due to family and work commitments, complete temporal remission of psoriasis, or other diseases unrelated to psoriasis. In addition, 3 patients withdrew 8–12 months after heliotherapy, but their data was included in the analysis.

The follow-up schemes for patient groups G1 and G2 are shown in Fig. 1. Both groups were followed for a period of 2 years, but the timing of the heliotherapy was different. The G1 patients received their 4-week heliotherapy course upon their inclusion in the study and were then followed up for an uninterrupted period of 24 months. In contrast, the G2 patients were intially followed for 12 months, after which they participated in the 4-week heliotherapy course, and were then followed up for another 12 months. During the follow-up, either before or after heliotherapy, all conventional anti-psoriatic therapies were allowed, but the patients were discouraged from arranging sun-vacation trips of their own.

Of the total of 95 patients entering heliotherapy, 48 patients belonged to group G1 (18 females and 30 males, mean age 40 years, range 22–61 years) and 47 to group G2 (14 females and 33 males, mean age 39 years, range 20–64 years). Skin type II (6) was present in 21%,

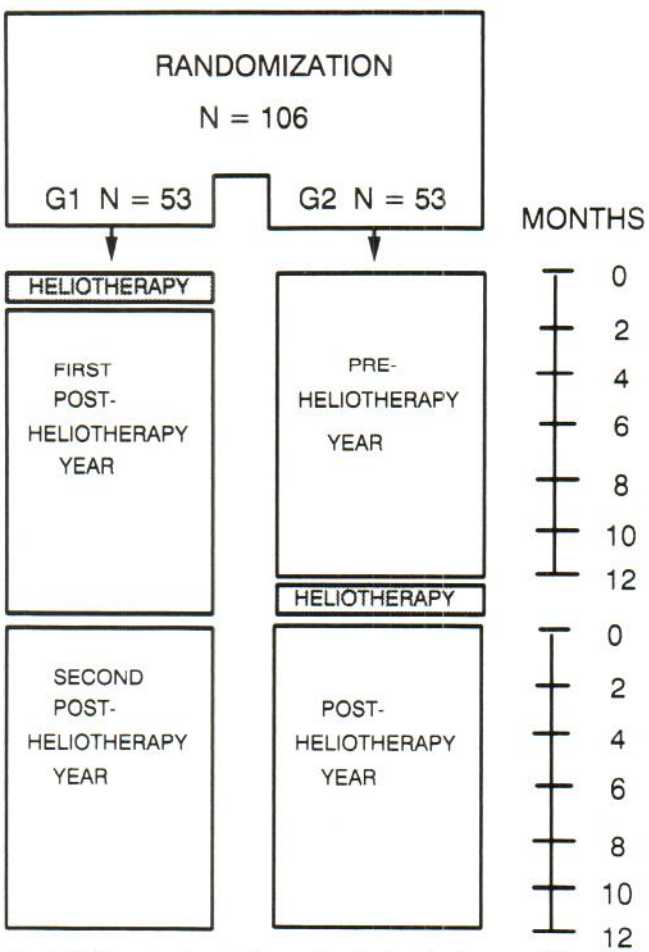

Fig. 1. Follow-up schemes for randomized patient groups G1 and G2.

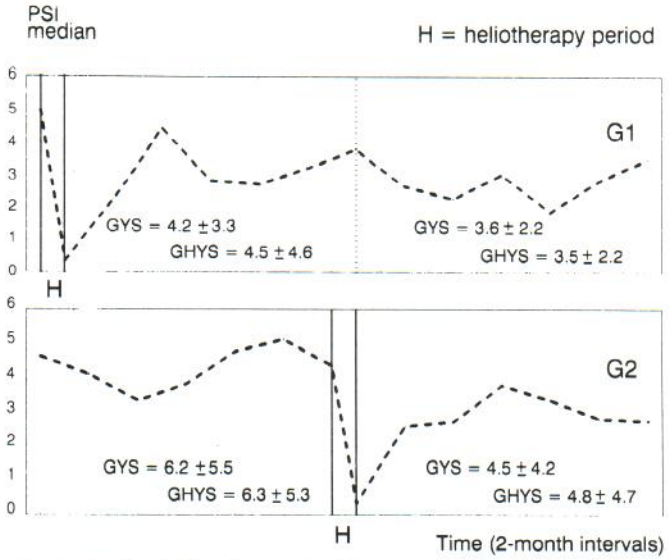

Fig. 2. Median PSI values at the follow-up examinations and group year scores (GYS) and group half-year scores (GHYS) and their standard deviations for the two patient groups G1 and G2.

type III in 59% and type IV in 20% of the patients. Psoriasis was of the plaque type in 73%, guttate in 24% and erythrodermic in 1%. The mean duration of psoriasis was 18 years, range 2–39 years. A total of 23% of the patients had joint complaints. The distribution of age, sex, skin phototype, type of psoriasis and duration of disease in the two groups was comparable, as were the percentages of patients receiving their heliotherapy either in November or in March.

Heliotherapy

Heliotherapy was undertaken in the Canary Islands, Spain, during winter months when UV radiation in Finland is negligible. Each patient received only one course of treatment. Altogether three 4-week heliotherapy periods were arranged, in November 1988, March 1989 and November 1989. The supervising staff consisted of one dermatologist, two nurses and a sports-and-leisure coordinator. In addition to supervised sunbathing, physical exercise and patient counselling sessions were arranged.

Depending on the skin type (6), sunbathing was started with either 0.5 or 1 h of noon-time exposure. This exposure time was increased daily to a level of 6 h by the end of the second week (5). Other anti-psoriatic treatments were avoided during heliotherapy, but anti-rheumatic or nonsteroidal anti-inflammatory drugs were not restricted at any time. Topical glucocorticosteroid or dithranol were allowed in cases of troublesome scalp psoriasis.

Psoriasis assessment and treatment records

During heliotherapy, the supervising dermatologist recorded each patient's psoriasis severity index (PSI) and use of therapy. One dermatologist (E.S.) examined the patients at 2-month intervals in the pre- and post-heliotherapy periods. The PSI scoring system (5) involved recording of scaling, infiltration and the area of psoriasis, with a maximum PSI value of 60. In the postheliotherapy follow-up, two relapse definitions were used in parallel, viz. time until recurrence of either 50% or 100% of the initial PSI level at the onset of heliotherapy. The disease experience over a period of time was measured by calculating each patient's mean PSI score over each full follow-up year; from these individual annual scores, mean values and standard deviations were calculated for the whole patient group and termed the group year score (GYS). For some of the comparisons, PSI data from only the last 6 months of each year were used to calculate a group half-year score (GHYS), in order to exclude the immediate (first 4 months) effects of a preceding heliotherapy period.

Furthermore, the time until institution of antipsoriatic therapy was recorded using two criteria: firstly, the start of any antipsoriatic treatment other than plain emollient, including use of mild tar preparations or the occasional application of a corticosteroid ointment, and, secondly, the institution of a specific anti-psoriatic treatment, such as phototherapy, photochemotherapy, systemic retinoid, dithranol ointment, or a self-arranged sun-bathing trip. To record the use of anti-psoriatic treatments, the patients filled in weekly questionnaires at home. The term weeks on treatment was introduced to estimate therapy usage and was defined as the number of weeks a patient had been using a particular anti-psoriatic treatment on at least one out of the 7 days of the calendar week.

Statistics

Group differences in background variables were tested by the chi-squared test. Changes in PSI within groups were analysed using the Wilcoxon one-sample rank sum test. Use of therapy comparisons within the groups were analysed using the sign test, and comparisons between the groups were made using the Mann-Whitney test.

The 2×2 cross-over design was employed in the analysis of the logarithm of the PSI scores with split-plot analysis of variance (7, 8). The treatment and period effects were separately calculated, as well as their interaction (therapy * period), to evaluate if the effect of heliotherapy was dependent on the period during which it had been given. The logarithmic transformation normalized the PSI score distribution. The logarithmic PSI scores of different groups were also compared by the Mann-Whitney test. All statistical tests were two-sided.

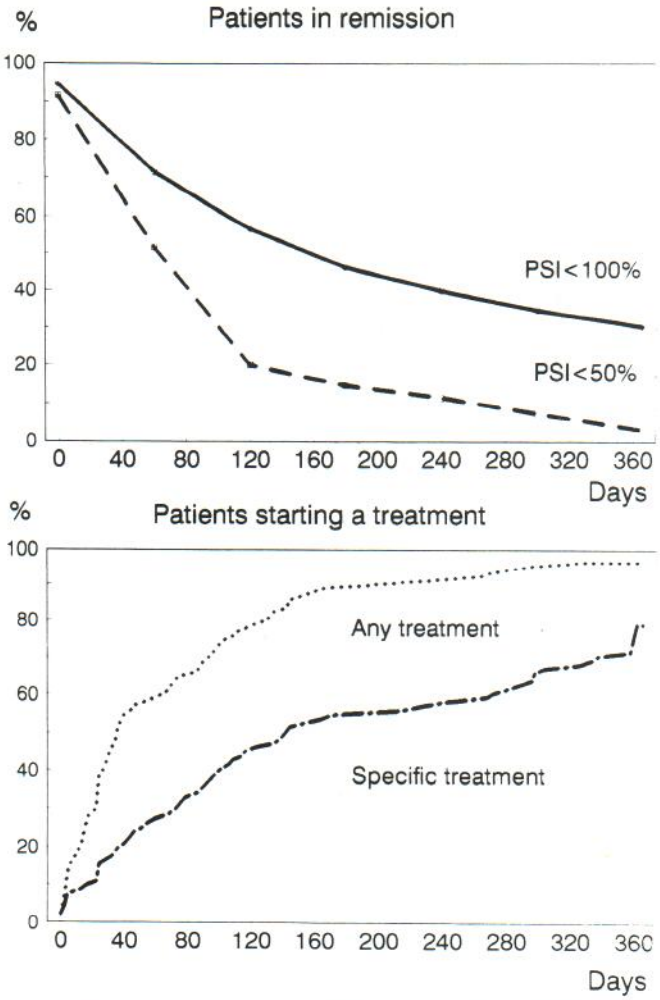

Fig. 3. Percentage of patients in remission defined as the PSI either <100% or <50% of the individual PSI at the onset of heliotherapy (upper panel) and therapy usage (lower panel) in the first post-heliotherapy year.

Table I. *Mean weeks on active treatment in the pre-heliotherapy year and the 2 post-heliotherapy years in patient groups G1 and G2*

Treatment	G1		G2	
	First post-heliotherapy year	Second post-heliotherapy year	Pre-heliotherapy year	Post-heliotherapy year
Glucocorticosteroid (topical)	14	17	28	14
Tar	1	1	3	2
Dithranol	6	4	6	7
UV B	4	6	5	4
PUVA	2	1	2	1
UVB + UVA (SUP)	1	0	2	0
Retinoid (oral)	1	2	4	1
Self-arranged heliotherapy trip	1	1	0	1
Any treatment	25	27	38	25

*** $p < 0.001$, * $p < 0.05$; the sign test (intra-group comparisons) and the Mann-Whitney test (inter-group comparisons).

RESULTS

Remission and relapse rates

The median PSI values in the two patient groups are shown in Fig. 2. At the onset of heliotherapy the difference between the PSI scores of the two patient groups G1 and G2 was not statistically significant. During heliotherapy, patients in both treatment groups (G1 and G2) showed a significant ($p < 0.001$) improvement in their PSI scores, from median values of 5.0 and 4.4 to 0.4 and 0.3, respectively (Fig 2.); the median PSI value for all patients was 4.7 at the start and 0.3 at the end of heliotherapy.

Fig. 3 shows the percentage of patients in remission defined as either PSI < 100% or < 50% of the pre-heliotherapy PSI during the first post-heliotherapy year. A PSI of 50% of the pre-heliotherapy value was reached in 85% of the patients at 6 months post heliotherapy, in 97% at 12 months, in 98% at 18 months, and in 100% at 24 months. The corresponding figures for a full relapse were 54%, 70%, 73%, and 73%.

Disease experience during the follow-up

The GYS and the GHYS are given in Fig. 2. The effect of heliotherapy was investigated taking advantage of the cross-over design of the study, by performing an analysis of variance. The effect of heliotherapy was statistically significant ($p<0.05$), and there also appeared to be a significant ($p<0.001$) period effect, but no significant therapy * period interaction was recorded. When the immediate (0–4 months) effect of the heliotherapy period was ruled out using the (months 6–12) GHYS, the results were essentially similar (Fig. 2). Furthermore, a significant therapy * period interaction effect was observed ($p < 0.05$). The period effects within GYS and GHYS and the interaction within GHYS were caused by the much lower PSI scores of group G1 in the second post-heliotherapy year as compared with the PSI scores of group G2 in the pre-heliotherapy year, thus also indicating the existence of a carryover effect within the group G1.

During the first year of the study, the patients randomized to an initial heliotherapy period (patient group G1) had a PSI GYS of 4.2 ± SD 3.3, which was significantly ($p < 0.05$) lower than the GYS of 6.2 ± SD 5.5 displayed by the patients randomized to an initial year of follow-up only (patient group G2). Group G2's GYS of 4.5 ± SD 4.2 observed in the post-heliotherapy year was highly significantly ($p < 0.001$) lower than the same group's preheliotherapy GYS. Due to the above-mentioned sustained influence of the previously instituted heliotherapy, the GYS of the G1 group of the second post-heliotherapy year did not differ significantly ($p = 0.455$) from the GYS of the first post-heliotherapy year within the same group.

Use of therapy

Cumulative percentages for the institution of treatment after heliotherapy are shown in Fig. 3. Some form of treatment was instituted at 6 months after heliotherapy by 89% of the patients, at 12 months by 97%, at 18 months by 99% and at 24 months by 100%. The corresponding figures for instituting a specific anti-psoriatic treatment were 55%, 79%, 86% and 91%. The use of different therapies in each follow-up year is detailed in Table I.

In both patient groups, the number of weeks on treatment in the (first) post-heliotherapy year (25 weeks in both cases) was very significantly ($p < 0.001$) lower than that (38 weeks) in the pre-heliotherapy year of the G2 patients. In contrast, no significant difference was discernible in use of therapy between the first and second post-heliotherapy year of patients in group G1, corroborating the aforementioned sustained influence of the previously instituted heliotherapy on psoriasis symptoms

in the second follow-up year. The post-heliotherapy decrease in use of therapy was principally due to a significant reduction in the use of topical glucocorticosteroids and systemic retinoids.

On the other hand, 21 patients in group G2 spent a total of 33 weeks on self-arranged sun-bathing trips in the first post-heliotherapy year, in contrast to only 5 patients spending a total of 8 weeks on sun-bathing trips in the preheliotherapy year. In patient group G1, 14 patients spent a total on 31 weeks of sun-bathing trips in the first postheliotherapy year and 20 patients spent 47 weeks on such trips in the second post-heliotherapy year. However, when the median PSI values for the first post-heliotherapy year were calculated separately for the patients who had made sun-bathing trips and those who had not, no significant difference was found. Furthermore, in the patients who had participated in the self-arranged sun-bathing trips, the PSI scores, recorded at 2-month intervals, were similar before and after these trips ($p = 0.86$).

DISCUSSION

The immediate and short-term (up to 6 months) data of our study corroborate earlier reports by us (5) and others (1–4) to the effect that heliotherapy effectively clears psoriasis. However, our investigation goes beyond any previous study in respect of its randomized design, the total length of the post-heliotherapy follow-up (up to 2 years) and in the use of precise criteria for recording disease severity and therapy usage. The main characteristics of the randomized patient groups were comparable in all pertinent respects. The both randomization groups were, furthermore, comparable as to the percentage of patients receiving their heliotherapy either in November or in March, thus eliminating any influence of this variable in between-group comparisons. The study design, incorporating an initial full year of pre-heliotherapy follow-up in one of the patient groups, provided a unique opportunity to make a parallel comparison of non-heliotherapy-treated and heliotherapy-treated patients. Our design also allowed a comparison, within one of the patient subgroups, of disease and treatment use scores from a preheliotherapy and a post-heliotherapy year.

The somewhat unexpected finding of long-term (up to 2 years) alleviation of psoriasis severity was reflected both in the psoriasis severity scores and the therapy usage scorings (Fig. 2, Table I). This effect may be caused by a number of mechanisms which do not necessarily exclude one another. First of all, the patients received a high UV radiation dose during the heliotherapy period. In parallel studies (9), we have recorded a mean total load of 118 erythemal units (EU) of sunburning radiation during our heliotherapy courses – a large dose to be received in only 28 days. This intensive UV radiation may have long-term metabolic or immunological effects on the skin; we have e.g. reported earlier that a 4-week heliotherapy course induced a marked, sustained elevation of epidermal total urocanic acid (UCA) levels, possibly by induction of the UCA-forming enzyme, histidase (10). The significantly diminished use of glucocorticosteroid ointments in the post-heliotherapy period (Table I) may also have exerted a favourable influence on the patients' condition. Long-term use of topical glucocorticosteroids is known to lead to cutaneous tolerance and a rebound effect with concomitant exacerbation of psoriasis (11), and 4 weeks of total withdrawal from the use of corticosteroid creams may, conversely, have had a favourable effect. Furthermore, the patient counselling provided during the heliotherapy courses may have led to a more consistent and stringent approach to home treatment, resulting in better disease control with a minimum of therapy expenditure. Interestingly, the post-heliotherapy increase in self-arranged sun-bathing trips did not influence the overall follow-up outcome. This is probably due to the short duration of the self-arranged trips (usually one week).

Psoriasis may also be influenced by psychosocial factors (12) and some of the curative effects of heliotherapy may be due, for instance, to psychological relaxation connected with freedom from usual responsibilities, and other factors such as psychological support from the heliotherapy staff and fellow patients. However, it is difficult to conceive that a psychological effect of this kind would last for up to 2 years after a heliotherapy trip. We have, in fact, been able to record favourable effects in the occurrence of psychosomatic symptoms only in the immediate post-heliotherapy period, with a reversal to initial levels within a period of 2–3 months (manuscript in preparation).

Irrespective of the reasons for the favourable outcome, our study demonstrates that, in addition to the substantial short-term (up to 6 months) curative effect of heliotherapy in psoriasis, a long-term (up to 2 years) alleviation of psoriasis severity can be achieved. This finding lends additional credibility to heliotherapy as a treatment modality in mild to moderately severe cases of psoriasis.

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