

CLINICAL REPORT

Heliotherapy in Atopic Dermatitis: A Prospective Study on Climatotherapy using the SCORAD IndexPEKKA AUTIO^{1,2}, PIRJO KOMULAINEN² and HARRY M. LARNI³¹Department of Dermatology, Military Central Hospital, Helsinki and University of Oulu, Oulu, ²Association for Skin Diseased People and³Research Institute of Military Medicine, Helsinki, Finland

The aim of this study was to investigate the suitability and effectiveness of heliotherapy in moderate or severe atopic dermatitis in adults in the Canary Islands. A total of 216 patients participated on 6 different 2- or 3-week heliotherapy trips. Using the Severity Scoring of Atopic Dermatitis Index (SCORAD), the severity of atopic dermatitis was assessed prior to the start of heliotherapy, after 2 weeks and then 3 months after the end of heliotherapy. A quality-of-life questionnaire was later mailed to all participants. The mean SCORAD index was reduced by 70% after 2 weeks of heliotherapy and was still 45% lower 3 months after therapy ($P < 0.0001$). At 3 months, the use of topical steroids was still significantly reduced ($P < 0.0001$), whereas there was no significant ($P = 0.1166$) change in the consumption of emollients. The quality of life of patients was improved and their self-treatment and working capacity was increased. As the longer 3-week period provided no significant additional advantage over a 2-week period, 2 weeks of heliotherapy can be considered optimal. In conclusion, heliotherapy is an effective and valuable therapeutic adjunct, especially in adults with severe atopic dermatitis. **Key words:** atopic dermatitis; heliotherapy; climatotherapy; Canary Islands; quality of life.

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Atopic dermatitis (AD) is a chronic, relapsing inflammatory skin disease that can be exacerbated by trigger factors such as psychological stress, changes in season and climate, irritants, allergens and infections (1). It has been repeatedly demonstrated that bacterial infections, especially by *Staphylococcus aureus*, exacerbate the course of AD. The superantigen produced by this pathogen and its corresponding T-cell subsets are believed to act as causative or pathogenic factors (2).

On the individual level, severe AD is a physically, mentally and socially extremely disabling disease that reduces the patient's quality of life (3). Moreover, the chronic course of the disease and required continuous

therapy impose a significant economic burden not only on the patient but also on the community. During the past three decades a marked increase in the prevalence of AD has been observed in the Western world – an unambiguous indication that the therapy of AD warrants particular concerns and should involve the public social health care sector (4–7).

Research and development of therapies in all chronic skin diseases is designed to achieve long periods of remission. Overall, treatment is largely based on the interchanging of different therapeutic modalities with the aim of preventing possible side effects or other undesirable consequences associated with single treatment modalities. The significant effects of heliotherapy (HT) (climatotherapy) on psoriasis have been demonstrated beyond doubt (8, 9), and it is a therapeutic modality in psoriasis today. In contrast to psoriasis, knowledge of the effectiveness of HT in AD is lacking. The aims of this open, uncontrolled and prospective study were to establish the suitability of HT as a therapeutic regimen for Finnish patients with AD, to estimate the duration of remission and to highlight the benefits provided by the alleviation of symptoms.

MATERIAL AND METHODS

Selection of the patients

Applications submitted by 505 patients for HT abroad provided information on skin type, according to self-assessment, previous UV therapy and response to phototherapy and natural sunshine. Information was gathered on other concomitant diseases, medication, use of alcohol, etc. The applicants were requested to mark the location and extent of the present skin condition on a diagram of the human body, and to enclose photographs of the skin areas involved. Each application was supplemented with the written medical opinion of the treating or referring physician.

The inclusion criteria in the HT study were: full legal age (18 years), previously diagnosed long-term moderate or severe AD (10), known response to conventional therapy, and tolerance of UV radiation (skin type II–IV). Known alcohol or drug abuse, severe mental disorders or a factor predisposing to photosensitivity were exclusion criteria. Discontinuation of immunosuppressive drugs such as cyclosporin or corticosteroid was recommended. Selection of the patients was carried out by the dermatologist in charge. Special emphasis was laid on the severity of AD and known response to UV radiation.

Patients

Two-hundred and sixteen patients were accepted (146 (68%) women and 70 (32%) men; mean age 35 years, range 18–68) and over 80% were of working age; 112 (52%) participated in the spring and 104 (48%) in the autumn HT sessions, and of these one half in a 2-week period the other half in a 3-week period.

Prior to HT, 101 patients (47%) had used systemic corticosteroids and 10 (14%) cyclosporine. Thirty-five patients (16%) had previous experience of HT and 172 (80%) had sometimes visited southern Europe. Specific food items were avoided by 60% of the patients, as they considered food intolerance relevant; 77% used alcohol and 19% were smokers.

In over 70% of the patients, atopic dermatitis had begun before the age of 5 years, and 64% had not experienced total remission of the symptoms at any time thereafter. The majority of the patients (92%) estimated that AD had influenced their working capacity during the previous 3 months and 45% had been on sick leave for AD during the past year. The vast majority of the patients ($n=199$, 92%) experienced treatment during the 3 months prior to HT as trying.

Heliotherapy periods

HT was organized in group tours twice a year, once in the spring and once in the autumn from September 1998 to March 2001 to the Canary Islands (29°N latitude, 15°W longitude) with a subtropical climate. Each patient was charged 170 Euros; expenses in excess of this were financed through a grant from RAY, Finland's Slot Machine Association. Six different holiday resorts—three in Gran Canaria, two in Fuerteventura and one on Teneriffe, were chosen. Because several patients were multi-allergic, special consideration was given to foods, exposure to animals and other factors likely to cause allergy problems. Two specially trained registered nurses accompanied the patients on all trips, one of whom was available at all times. The dermatologist in charge was always present during the second week of the HT period.

Before departing from Finland, the patients received a well-planned daily schedule for the 2- or 3-week period. Daily controlled and supervised sunbathing, mostly between 09.00 a.m. and 17.00 p.m., was increased gradually. Swimming in the ocean was encouraged. The patients kept a personal HT diary to note therapy progress and any problems. The daily programme included individual consultation, small-group sessions, lectures, question hours, practical demonstrations of skin treatments and so on organized by the personnel. There was ample time each day for the exchange of personal experiences. Moderate use of alcohol was permitted after the daily programme, but inebriation or other alcohol-related problems were not tolerated.

Severity scoring of AD and patients' subjective evaluations

The International Severity Scoring Atopic Dermatitis (SCORAD) index of the European Task Force on Atopic Dermatitis was used for assessing disease activity in all patients (11). The SCORAD index of both 2- and 3-week patients was assessed three times, i.e. prior to departure (initial examination), after 2 weeks of HT (intermediate examination) and about 3 months following HT (final examination). The initial, intermediate and final scorings were done by one and the same dermatologist when possible.

At the initial examination, patients were requested to give their subjective evaluation of their present skin condition (Table I). This was repeated at the intermediate and final examinations (Table II). At the final examination, the

patients were asked about the course of their disease, changes in therapeutic needs, influence on the use of healthcare services, psychological and social well-being and the rate of absence from work. At the end of the last HT period in March 2001, a questionnaire on changes in quality of life and on skin treatment expenses after HT was mailed to all patients.

Statistics

The chi-square test, the Fisher exact test and the Mantel-Haenszel correlation statistic chi-square test were used for analysing associations between the categorical variables.

RESULTS

Patient opinion on skin condition in relation to duration of heliotherapy

About 80% of the patients in both the 2- and 3-week groups considered the duration of the HT period as appropriate, considering their job, family and leave of absence. Patient evaluations of their skin condition before leaving for HT are presented in Table I, and after 2 weeks of HT and 3 months following HT in Table II.

Changes in SCORAD indices

Data on initial, intermediate and final medical examinations were available and valid for 194 (90%) patients. In patients leaving for HT in the autumn, the initial mean total score was slightly higher than for patients leaving in the spring. Patients with asthma had higher scores than non-asthmatic patients, and the men had

Table I. Patients' subjective estimate of their skin condition at initial examination prior to heliotherapy ($n=215$)

| Skin condition | <i>n</i> | % |
|----------------|----------|------|
| Very good | 5 | 2.4 |
| Good | 63 | 29.4 |
| Moderate | 91 | 42.1 |
| Poor | 51 | 23.5 |
| Very poor | 5 | 2.4 |

Table II. Patients' subjective estimate of their skin condition at intermediate examination after 2 weeks of heliotherapy (HT) ($n=215$) and at final examination 3 months after discontinuing HT ($n=184$)

| Patients' estimate of skin condition | After 2 weeks | 3 months after |
|--------------------------------------|-----------------------|----------------------------------|
| | of HT <i>n</i> (%) | completion of HT <i>n</i> (%) |
| Much better | 155 (72.1) | 88 (47.8) |
| Somewhat better | 57 (26.5) | 65 (35.3) |
| No improvement | 2 (4.3) | 18 (9.8) |
| Somewhat worse | 1 (0.5) | 11 (6.0) |
| Much worse | 0 (0.0) | 2 (1.1) |

higher SCORAD indices than the women. These differences were evident at all examinations, but they were not statistically significant (data not presented).

The mean initial SCORAD was 40 ± 16 (range 7–86; $n = 216$). Two weeks after HT it was significantly reduced to 12 ± 9 (range 0–43; $n = 216$) ($p < 0.0001$) and remained reduced 3 months after HT, i.e. 22 ± 16 (range 0–77; $n = 194$) ($p < 0.0001$) (Fig. 1).

There was no significant difference between the mean SCORAD indices of patients receiving 2 weeks of HT and those receiving 3 (Fig. 1).

Effects of heliotherapy on individual consumption of topical drugs, cost of treatments and quality of life

Three months after HT, the consumption of topical corticosteroid creams (g/month) was significantly lower ($p < 0.0001$) compared to pre-HT consumption. No change was observed in the consumption of basic emollients ($p < 0.1166$). At the initial interview preceding HT, the average monthly treatment expenses were 267,13 Euros; 3 months after HT the figure was 163,16 Euros, which is on average a 40% reduction (data not presented).

The answers to the question "What, in your opinion, is quality of life?" highlighted different matters associated with the control and quality of personal life. Almost all patients (99%) were of the opinion that HT had had a favourable effect on the quality of their lives. The most significant single factor was amelioration of the skin condition, followed by an improved mood and increased self-treatment capacity. An increased working capacity was experienced by 84% of the patients, and 80% believed that HT had significant or very significant favourable effects on the future treatment of their skin disease.

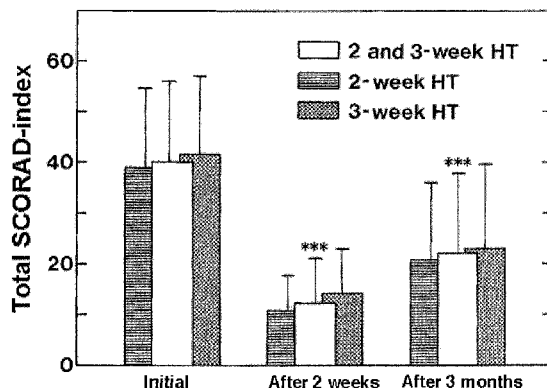


Fig. 1. Total SCORAD index (mean \pm SD) at initial examination, at intermediate examination after 2 weeks of heliotherapy (HT), and at the final examination 3 months after HT is completed. The mean score at the initial examination differed significantly ($***p < 0.0001$) from the mean scores at the intermediate and final examinations.

Problems during heliotherapy periods

The most common complaints in addition to the problems associated with AD itself were upper respiratory tract infections, ear infections, herpes, mild allergic reactions, tourist diarrhoea, anxiety and home-sickness.

Daily costs of heliotherapy

The total costs of HT per day per patient amounted to 205 Euros. This included all travel and accommodation expenses and half-board, the salaries of the medical staff, but not the study expenses.

DISCUSSION

It was not easy to select patients for HT. AD may improve or it may regress within a very short period of time. In some patients the skin condition was worse and in others better compared with the screening examination. The initial scoring was influenced by recent therapeutic measures which had not been restricted. However, in the majority of cases patient selection was correct. Scoring the severity of AD is not without difficulty (12, 13). The same dermatologist therefore performed the scoring in all cases (14). To the best of our knowledge, no suggestions have been presented for classifying patients in accordance with individual SCORAD indices. Based on our present series, we suggest the following classification: SCORAD < 30 = mild, 30–40 = moderate, 41–50 = severe, > 50 = very severe.

The therapeutic effect of UV phototherapy in AD can be attributed to several factors, including epidermal thickening, increase in spontaneous DNA repair in lymphocytes, reduction of skin colonization with *Staphylococcus aureus* and suppression of its superantigen production (15–18). UV phototherapy, on the other hand, is not always readily available to all patients—many patients in northern Finland live up to 145 km from the nearest phototherapy facility.

Exposure to summer sunshine has been indicated as important in the control of AD in addition to measures reducing trigger factors such as skin irritant exposure and infection (19). Moreover, it has been shown that a combination of salt-water bathing and sunshine is an effective form of therapy for both psoriasis and AD (8, 20).

Both anxiety and depression are prevalent psychiatric co-morbidity factors associated with AD (21). In this respect, rest and avoidance of possible stress, exhaustion and anxiety aggravating factors at work and/or home are important alleviating factors in AD during HT abroad. This was clearly reflected by the patients' answers to inquiries. The presence of a nurse specialized in psychiatry during one HT period was greatly appreciated by the patients, although engaging in more profound therapy sessions was avoided. The

necessity of dermatological and psychological collaboration in AD is also confirmed (21). The benefits of support from fellow patients and the possibility to exchange experiences cannot be overestimated.

HT is not completely without risk. The possibility of sunburn can be minimized by supervision and by stepwise increasing of daily sunbathing periods. The risk of skin tumours and accelerated ageing of the skin must also be taken into consideration (22–24). On the other hand, this also applies to UV phototherapy and is part of the total risk-benefit of AD therapy. In our experience, the more practical problems and risks during HT periods, including the use of alcohol, can be managed. Rules and restrictions applied too strictly to the social life of patients receiving HT lead to undesirable results.

The immediate and short-term clinical outcome was very good in the majority of patients (Fig. 1, Table II), including several total clearances of AD. This is in accordance with retrospective results obtained at the Dead Sea (25). It was not possible to perform a case-control study comparing the results with conventional UV phototherapy and topical treatments or to perform a longer follow-up. A thorough cost-benefit analysis was therefore impossible. Based on current prices at the Helsinki University Hospital, the costs of treatment for at least one week on a dermatological ward, followed by 2 outpatient visits and 15 UV treatments during the winter season, amount roughly to 350 Euros per patient with severe AD and 2700 Euros for the community. These costs may exceed the price of a 2-week HT period abroad (2870 Euros). It is obvious that costs accumulate during HT as well as hospital inpatient treatments, since both require leave of absence. In our opinion, HT should be targeted especially at patients with severe AD (SCORAD > 40), and for those who use community-supported modalities. The available data demonstrate that the total expenses of AD are reduced both directly, from the decreased costs of topical skin care, and indirectly, by an increase in the patient's working capacity and reduction in number of days on sick leave. HT could therefore be considered a cost-effective therapeutic modality in AD (26).

To our knowledge, this is the first prospective HT study employing one of the severity scoring methods for AD. The results indicate that supervised HT in the Canary Islands is a highly effective therapeutic modality in AD. As the 3-week HT period fails to provide any definite additional advantages for the majority of patients, a 2-week HT period seems optimal.

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