

Local and Systemic Effect of UVB Irradiation in Patients with Chronic Hand Eczema

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Sjövall P, Christensen OB. Local and systemic effect of UVB irradiation in patients with chronic hand eczema. *Acta Derm Venereol (Stockh)* 1987; 67: 538–541.

The effect of local as well as whole body irradiation with UVB was investigated in patients with chronic hand eczema not responding to conventional topical treatment. UVB irradiation of the hands was significantly more effective than placebo. Whole body UVB irradiation combined with additional irradiation of the hands proved to be even more effective than local treatment in clearing chronic hand eczema. Due to the relatively fast relapse of the hand eczema after the UVB treatment period maintenance treatment is warranted. This could possibly be carried out by the patients at home, but under surveillance by a dermatologist. (Received May 12, 1987.)

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Chronic hand eczema, often of multifactorial etiology and resistant to conventional topical treatment, is a well-known problem and a constant challenge in clinical dermatology. Many patients are forced to change their occupation or sometimes even retire resulting in individual problems and considerable costs for the society.

Phototherapy such as PUVA is reported to have a good effect on chronic hand eczema (1–3). Also, it is indicated that UVB irradiation is beneficial in those patients (3, 4).

Recently we have shown that UVB irradiation possesses a local as well as a systemic suppressive effect on the elicitation phase of allergic contact dermatitis (ACD) in humans (5). In the present double blind study we have investigated the effect of UVB irradiation locally on chronic hand eczema. Furthermore, we have investigated whether additional whole body UVB irradiation is more effective than local exposure alone.

MATERIAL AND METHODS

Patients

Eighteen patients, 15 females and 3 males, mean age 45 (26–67 years) participated in the study. All patients had one or more patch test proven allergic reactions (nickel 8, cobalt 7, colophony 5, ethylenediamine 4, cromate 3, Kathon® CG 1, Formaldehyde 1, glutar aldehyde 1). In 11 of the 18 patients the positive patch test reactions were considered of relevance in maintaining the chronicity of the hand dermatitis. Of the remaining 7, 4 were atopics and 3 patients were regarded as having a constitutional endogenous eczema. By history 16 of the 18 patients reported recurrent vesicular eruptions mainly on the volar aspects of the hands. At the clinical investigation before the start of the study 3 patients presented a very active palmar vesiculosis, 7 patients showed an erythroscamous-vesicular mainly palmar located eczema and the remaining 8 presented an erythroscamous palmar as well as dorsal hand dermatitis.

All patients suffered from a long standing chronic hand eczema, resistant to conventional topical treatment with potent corticosteroids and moisturizers, with a median duration of 6 years (1–38 years). Sixteen of the 18 patients had never experienced a period of total clearance since the start of their hand eczema. According to Swedish legislation the dermatitis in 9 of the patients was regarded as occupational and the patients had obtained economic compensation for that reason.

Design of the study

Before entering the study a detailed history and clinical evaluation regarding localization and morphology of the hand eczema was performed. The patients were randomly divided into 3 groups with different treatment protocols with 6 patients in each group.

- Group 1. UVB-exposure of the hand only (local effect).
- Group 2. Irradiation of the hands with filtered light containing no detectable ultraviolet radiation (placebo).

Group 3. Whole body UVB exposure with additional irradiation of the hands (systemic + local effect).

For irradiation of the hands 2 Sylvania F 75-85/W/UV21 fluorescent tubes emitting a spectrum of 230-365 nm with a maximum at approximately 310-315 nm with an irradiance of 1.7 mW/cm² of UVB and 0.5 mW/cm² of UVA, as measured with a UV-meter (Herbert Waldmann, Werk Für Lichttechnik, Schwenningen, FRG) at a distance of 15 cm from the tubes, were mounted in a rack for laboratory use. A wooden frame with a chicken net was mounted on the rack making it possible to insert a plastic plate filtering all detectable ultraviolet radiation. The whole device was covered by a green cloth, thus making it possible to perform a double blind trial between the patients in groups 1 and 2.

Two different irradiation protocols were followed. The first for palmar lesions and the second for dorsal lesions of the hands as well as for whole body irradiation. All treatments of the hands were performed in the device described above. Following hand exposure the 6 patients in group 3 were given whole body exposure in a Waldmann UV 1000 unit equipped with 26 Sylvania F 75-85/w/UV 21 fluorescent tubes with an irradiance of 1.4 mW/cm² of UVB and 0.5 mW/cm² of UVA measured at a distance of 20 cm from the tubes. During this exposure the patients used gloves avoiding additional exposure of the hands. The initial UVB dose for the palmar aspects of the hands was approximately 0.1 J/cm² and the dose was steadily increased to a maximal dose of 1.3 J/cm² resulting in an accumulated dose of approximately 19 J/cm². The initial dose for whole body and dorsal hand exposure was 0.025 J/cm² and this dose was steadily increased to approximately 1.0 J/cm² resulting in an accumulated dose of 13 J/cm² (due to variance in irradiance between the fluorescent tubes used for local and whole body treatment the dorsal aspects of the hands received an accumulated UVB dose of approximately 16 J/cm²).

The protocols were designed for treatment 4 times weekly for 8 weeks (a maximum of 32 exposures). A clinical examination was carried out after 16 exposures and again if a patient cleared before the end of the study or after 32 exposures. For statistical purposes a score system was used. 2=cleared, 1=improved and 0=unchanged/worse. Thus, it was possible to analyse the material using the Wilcoxon rank sum test for paired observations.

During the study period the patients were allowed to use their ordinary topical treatment. Three months after the end of the study each patient was mailed a questionnaire to obtain information about the course of their hand dermatitis and if they considered the long rather time consuming treatment beneficial.

RESULTS

Three of the 18 patients (one in each group) failed to conclude the study due to personal reasons. Side effects were seen neither in patients receiving UVB irradiation locally nor in patients exposed to whole body UVB.

I. UVB irradiation locally

Two patients were cleared before the end of the study (after 25 and 26 irradiations respectively). The remaining three all improved both objectively and subjectively (Table I).

II. Placebo group

One patient cleared (after 18 exposures). One patient improved whereas the other 3 patients remained unchanged (Table I).

III. Local + systemic effect of UVB irradiation

All patients cleared, two before the end of the study (after 26 and 27 treatments respectively) while the remaining 3 were cleared at the end of the study (Table I).

Statistical calculations

Local UVB irradiation of the hands was significantly better ($p \leq 0.05$) than placebo. Furthermore whole body UVB irradiation with additional irradiation of the hands was significantly better than the local treatment alone ($p \leq 0.05$).

Follow up

When followed up 3 months after the end of the treatment period two of the patients in group I (local UVB irradiation) still experienced improvement while the other 3 had exacerbations after 1-12 weeks (medium 5 weeks) after termination of UVB exposure (Table I). In the placebo group the patient who healed had an exacerbation after 3 weeks, the patient who improved remained so for two weeks while the other 3 remained unchanged (Table I). In group 3 (local + systemic effect of UVB irradiation) the patients stayed clear for 3-10 weeks (medium 6 weeks) (Table I).

DISCUSSION

In this clinical trial, concentrating on a group of patients with long-standing chronic hand dermatitis, we have shown that UVB locally is effective in controlling the hand dermatitis at least as a potent adjuvant to topical treatment. Furthermore, combining local and whole body UVB irradiation is even more effective in clearing chronic hand dermatitis. The effect of UVB irradiation of the hands found in this study is in agreement with the results reported by Austad & Mørk (4) and Rosén et al. (3). To our knowledge the beneficial clinical effect of additional whole body treatment of chronic hand dermatitis, has not been reported earlier. However, it has been shown that UVB possesses the ability to suppress systemically the elicitation phase of ACD in humans (5). We can only speculate that such a mechanism plays a role in our material consisting of patients with hand dermatitis where contact allergy was just one of several causative factors.

Table I. *Effect of placebo, UVB on hands and UVB on hands+body in patients with chronic hand eczema*

<i>Placebo</i>					
Sex	♀	♀	♂	♀	♂
Age (years)	61	26	42	50	33
No. of treatments	18	32	32	32	32
Remission (weeks)	3	8	-	-	-
Response	Cleared	Improved	Unchanged	Unchanged	Unchanged
<i>UVB on hands</i>					
Sex	♀	♀	♀	♀	♂
Age (years)	53	62	58	30	31
No. of treatments	25	26	32	32	32
Remission (weeks)	12	5	>15	>15	1
Response	Cleared	Cleared	Improved	Improved	Improved
<i>UVB on hands+body</i>					
Sex	♀	♀	♀	♀	♀
Age (years)	35	36	33	27	67
No. of treatments	26	27	32	32	32
Remission (weeks)	5	3	10	8	4
Response	Cleared	Cleared	Cleared	Cleared	Cleared

When dealing with a patient with a severe chronic hand dermatitis, not controlled by topical treatment and other protective measures, local UVB irradiation of the hands can be recommended. If this regimen is not effective, additional whole body irradiation might be valuable. It has been shown earlier that oral psoralen photochemotherapy (PUVA) is effective in chronic hand dermatitis (1-3). However, several drawbacks for the patient is involved with this treatment (binding to day care center, nausea, avoidance of sun exposure, wearing of polaroid sun glasses, effective anticonception, e.g.). As opposed to this, local UVB treatment of the hands is a rather simple procedure without immediate side effects and could easily be performed by the patient at home with suitable equipment. Neither PUVA nor UVB irradiation results in definite cure, the dermatitis recurs as also observed in our study. Therefore maintenance treatment is probably needed. However, if such treatment is carried out at home the carcinogenic potential of UVB must be considered and the patient controlled with regular intervals by a dermatologist.

ACKNOWLEDGEMENTS

We wish to thank Mrs Karin Lundberg, who gave the UVB exposures and Mr Björn Edman for performing the statistical analysis. This study was supported by grants from the Alfred Österlund and Finsen Foundations.

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