

Enhanced Response of Psoriasis to UVB Therapy after Pretreatment with a Lubricating Base

A Single-blind Controlled Study

BERIT BERNE¹, INGA BLOM² and SUNE SPÅNGBERG¹

¹Department of Dermatology, University Hospital, Uppsala and ²The Psoriasis Day Care Centre, Örebro, Sweden

Forty-three out-patients with stable plaque-type psoriasis involving 10–30% of the skin participated in a single-blind controlled study. The psoriasis lesions on one half of the body were treated with a lubricating base of the oil-in-water type before UVB exposure, while those on the other side of the body received UVB only. The rates of improvement of scaling, infiltration and erythema were compared in 127 symmetrical pairs of psoriasis plaques. The scores for the three variables were then summed to yield a total score for the effect of treatment. After only 2 weeks of treatment and throughout the treatment period the rate of improvement in the total score was significantly ($p < 0.001$) accelerated on the body half treated with the emollient compared with the control side. Pretreatment with a suitable lubricating base can thus result in shorter treatment periods, which means that the surrounding skin will be exposed to smaller doses of UVB, with a diminished risk of actinic damage.

(Accepted May 2, 1990.)

Acta Derm Venereol (Stockh) 1990; 70: 474-477.

B. Berne, Department of Dermatology, University Hospital, S-751 85 Uppsala.

UVB treatment of psoriasis is effective and is especially convenient for out-patients. A matter of concern, however, is how to achieve an optimal local effect of the radiation in the psoriasis plaques without exposing the normal surrounding skin to high doses of UVB, with the consequent risk of actinic damage.

Experimental studies on the effects of pretreatment of psoriasis plaques with emollients (1,2) have shown that application of topical lubricants increases spectral transmittance and decreases spectral remittance in the stratum corneum of psoriasis lesions. Anderson et al (1) found that the regular reflectance occurring at the surface of psoriasis plaques was greater than for normal skin, but that after application of lipophilic compounds the reflectance decreased im-

mediately to values within the range for normal skin. It has also been claimed (3) that when applied prior to phototherapy, non-photosensitizing lubricants significantly enhance the effectiveness of this treatment. To our knowledge, no controlled clinical studies have been published to substantiate this claim.

The findings in an earlier open study (4) suggested that pretreatment of psoriasis with a commercially available emollient, Decubal® (Dumex Ltd, Denmark), before UVB phototherapy could result in shorter treatment periods. The findings in that study prompted the present one, which was undertaken in a single-blind controlled design. In addition, the UV absorption spectra of different lubricants were determined.

MATERIALS AND METHODS

Patients and irradiations

Forty-three consecutive out-patients (24 men and 19 women, mean age 45.8, range 19–86 years) completed the study. Their psoriasis was of the stable plaque-type, covering at least 10% of the skin (range 10–30%). To minimise the influence of natural sunlight, the study was performed from September to April, at the Department of Dermatology, University Hospital, Uppsala (24 patients) and the Psoriasis Day Care Centre, Örebro (19 patients). Drugs known to affect psoriasis or photobiological responses to UV radiation were not permitted for one month preceding and during the study. No topical treatment except lubricants was applied in the two weeks preceding the study. Decubal® was the only treatment allowed during the study. Decubal® is an emollient of the oil-in-water type (composition: cetanol, glycerol, isopropylmyristate, highly purified adeps lanae, Span 60, Tween 60, silicone fluid AK 200–300, sorbic acid, purified water). When patients were scheduled for the study they were requested not to apply the cream later than the evening before UV treatment. The patients received total body UVB in erythemogenic doses 2–3 times a week. The UV source was a Waldmann 1000 cabin equipped with 26 Sylvania UV 6 fluorescent tubes (4). A few minutes before irradiation, the emollient was applied to the psoriatic plaques on one side of the body, which was chosen at random at the start of the study. The initial and fortnightly examinations of each patient were carried out by the same physician, who was unaware of which side of

Table I. Scores before treatment, after 10 and 12 weeks (end point) of treatment (mean \pm SD).

	Before treatment	Emollient + UVB 10 w	UVB 10 w	Emollient + UVB 12 w	UVB 12 w
Scaling	2.09 \pm 0.62	0.43 \pm 0.63	0.72 \pm 0.67	0.35 \pm 0.60	0.53 \pm 0.61
Infiltration	2.25 \pm 0.59	0.46 \pm 0.63	0.77 \pm 0.75	0.38 \pm 0.59	0.70 \pm 0.43
Erythema	2.24 \pm 0.57	0.75 \pm 0.55	0.88 \pm 0.49	0.67 \pm 0.58	0.77 \pm 0.43
Total score	6.58 \pm 1.44	1.63 \pm 1.63	2.37 \pm 1.72	1.39 \pm 1.60	1.97 \pm 1.5

the body was being treated with the cream. Three symmetrical pairs of lesions in each patient were evaluated for the degree of scaling, infiltration, and erythema, on the scale: 0 – none, 1 – slight, 2 – moderate, 3 – severe. The scores for the three variables were then summed to yield a total score. The end point of the study was defined as either clearance of psoriasis on both sides or 12 weeks of treatment. A score for erythema of up to 1 was accepted as healing, since in the earlier study, in which the patients themselves decided what degree of clearance was acceptable, they tended to accept some persistent erythema (4).

Four patients dropped out, one because of rapid progression of his psoriasis which required oral treatment with retinoids, and the others for practical reasons. No side effects of the Decubal® treatment were noted.

Photospectral analyses

The UV absorption spectra of Decubal®, Decubal® with 5% and 10% carbamide, white petrolatum and white petrolatum with 2% salicylic acid were determined with a spectrophotometer with a 2 nm spectral band-width (UV-Icon 810, Kontron AG, Zürich, Schweiz). The samples were dissolved in chloroform and 2-propanol (1:1). The solvent was used as a reference.

Statistics

The statistical significance of differences between the pretreated and non-pretreated sides was calculated by McNemar's test.

RESULTS

Clinical study

The severity of the patients' psoriasis before treatment was moderate to severe with a total score of 6.58 \pm 1.44. For mean scores of the different variables see Table I.

From week 2 and throughout the study period the mean scores for scaling, infiltration and total score were lower in the psoriasis plaques pretreated with the emollient before UV exposure compared to

those treated with UVB alone. For erythema there were no statistical differences found throughout the study.

The total mean score was diminished from 6.58 before treatment to 1.39 on the pretreated and 1.97 on the non pretreated side after treatment. Table I shows the mean scores before treatment and at week 10 where the highest statistical differences between the bodyhalves were found, and after the treatment period of 12 weeks where the differences were somewhat less pronounced.

Fig. 1 shows the improvement rate of the psoriasis plaques treated with the lubricating base and UVB compared with those treated with UVB alone. The diagrams illustrate the improvements of scaling, infiltration, erythema and the total score, expressed as per cent. The pairs of psoriasis lesions included in the Figure are only those that showed a different rate of improvement within the pair, not the pairs showing parallel improvement.

Significantly quicker improvement of scaling (Fig. 1A) was found in the psoriasis plaques that were treated with Decubal® + UVB than in those on the side treated with UVB only. This difference was observed after only 2 weeks of therapy. At the end of the treatment period, however, the difference was not significant.

The improvement rate of infiltration (Fig. 1B) was considerably faster ($p < 0.001$) in the pretreated than in the non-pretreated lesions. This difference was already noted after the second week of therapy, and was maintained throughout the study.

Regarding erythema (Fig. 1C), no statistically significant difference was found between the two sides.

Fig. 1D shows the total score. After only 2 weeks of therapy and throughout the treatment period the improvement rate was markedly greater ($p < 0.001$)

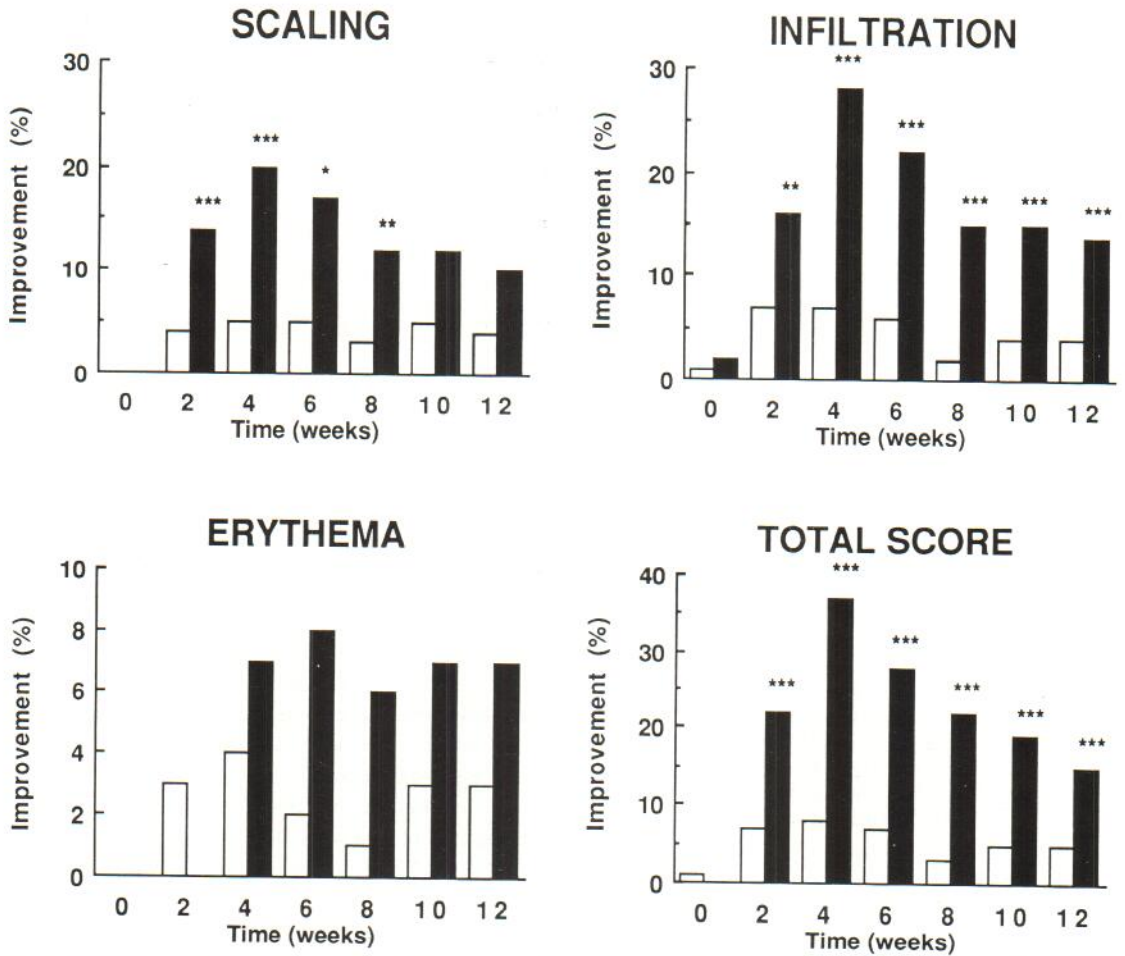


Fig. 1. Improvement rates for scaling (A), infiltration (B) and erythema (C), and the total improvement score (D) in 127 symmetrical pairs of psoriasis lesions, expressed as per cent. □, UVB treatment; ■, Decubal® + UVB treatment. * = $p < 0.1$, ** = $p < 0.01$, *** = $p < 0.001$.

on the Decubal®-treated side than on the control side.

Photospectral analyses

Fig. 2. illustrates the UV absorption spectra for Decubal®, white petrolatum and white petrolatum with 2% salicylic acid. The absorption for Decubal® was low throughout the UV spectrum studied (200–350 nm) and approached nil in the UVB range (280–320 nm). The addition of 5% or 10% carbamide to Decubal® did not alter its absorption spectrum (not shown). White petrolatum had a high peak at 230 nm, and absorbed five times more UVB than Decubal® in the lower UVB range and twice as much in the higher range. White petrolatum with 2% salicylic acid showed two high peaks, one in the short wave-

length range, and a very high one (9 times that of Decubal®) at 305 nm.

DISCUSSION

This single-blind controlled study has shown a higher improvement rate in psoriasis plaques pretreated with a lubricating base before UVB exposure than in those receiving UVB treatment alone. The present results support the previous finding, in an open study (4), of more rapid clearance of psoriasis after such combined treatment than after treatment with UVB only.

In the open study the patients were instructed to decide when acceptable healing was attained on the emollient treated side. It appeared that they tended

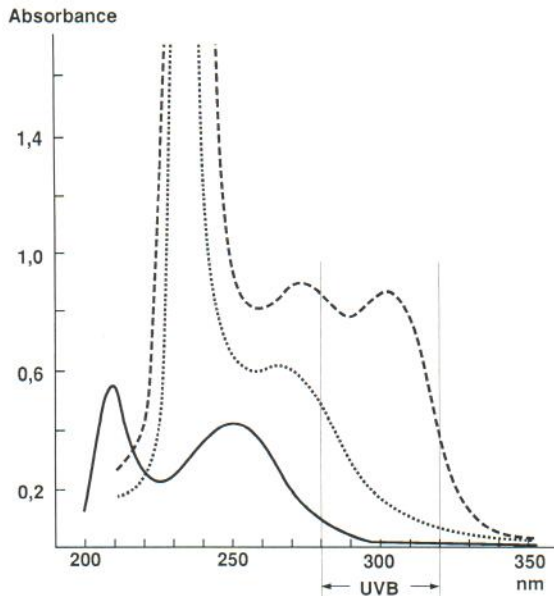


Fig. 2. Absorption spectra for Decubal® (—), white petrolatum (.....) and 2% salicylic acid in white petrolatum (---).

to accept some degree of persistent erythema but no scaling or infiltration. In the present study our definition of psoriasis healing was more strict (see Materials and Methods) and clearance of both sides was aimed at. Unfortunately total clearance was not achieved on both halves of the body during the treatment period in a sufficient number of pairs of lesions for statistical analysis. We therefore chose to report the rate of improvement.

In approximately half of the lesions (not included in Fig. 1) the same score within the pair, i.e. parallel improvement, was noted. This may be explained by a carry-over effect of the daily treatment with the emollient which the patients were allowed. Using an optothermal infrared spectrometry technique, Frödin et al (5) found that during daily application of Decubal® there was a steady increase in the water

content of the stratum corneum from day one to day three and a decrease already on the day after the application was discontinued. We therefore suggest that the differences between the pretreated and the non-pretreated lesions would have been still more pronounced if the patients had only applied Decubal® immediately before irradiation and had not been allowed to use the cream in between the UV treatments.

The optical properties of the emollient used in this treatment regime are of course crucial. White petrolatum and white petrolatum with salicylic acid, which have been used by psoriasis patients for many years, have absorption spectra that are unsuitable for UVB treatment (Fig. 2). Today the most frequently used emollients are cream bases, often with the addition of carbamide. The cream base used in this study, Decubal®, with and without 5% or 10% carbamide, has almost no absorptive qualities in the UVB range (Fig. 2), making it suitable for treatment prior to phototherapy. Other lubricating pretreatments such as oil baths, and saunas, have not been studied but are interesting but more time-consuming alternatives.

REFERENCES

1. Anderson RR, Parrish JA. The optics of human skin. *J Invest Dermatol* 1981; 77: 13-19.
2. Farr PM, Diffey BL, Steele MC. A preliminary study on the in vivo transmission of light through psoriatic plaques. *Photodermatology* 1984; 1: 87-90.
3. Anderson RR, Le Vine MJ, Parrish JA. Selective modification of the optical properties of psoriatic vs normal skin. Book of Abstracts, 8th International Photobiology Congress, Strasbourg, France, July 1980: 152.
4. Berne B. Effect on psoriasis healing of a lubricating base applied prior to phototherapy: an open study. *Photodermatology* 1986; 3: 188-190.
5. Frödin T, Helander P, Molin L, Skogh M. Optothermal infrared spectrometry (OTIS) - a specific method for assessing the hydration of stratum corneum *in vivo*. *Bioeng Skin* 1988; 4: 115-130.