

Comparison of Broad-Band UVB Minimal Erythema Dose(MED) Between Psoriasis Patients and Normal Healthy Persons in Korea

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Background : Most psoriasis patients have experienced improvement of their skin lesions after sun-exposure. However, some patients complained of exacerbation of their symptoms by sunlight. We usually call it as photosensitive psoriasis.

Objective : This study aimed to know whether psoriasis patients have increased photosensitivity through comparison of minimal erythema dose(MED) of UVB between psoriasis patients and normal healthy volunteers.

Methods : The MED of 52 psoriasis patients and 39 normal healthy volunteers was determined by gradual increase of UVB in $10\text{mJ}/\text{cm}^2$, starting from $30\text{mJ}/\text{cm}^2$. And we used independent sampled T-test to evaluate statistical significance.

Results : The UVB MEDs obtained from lower back of psoriasis patients and normal subjects were 79.2 20.9 mJ/cm^2 and 64.4 $21.9\text{mJ}/\text{cm}^2$ respectively ($p < 0.05$). It was significantly higher in psoriasis patients than normal subjects.

Conclusion : This study demonstrates that the photosensitivity is not problematic in managing Korean psoriasis patients compared with normal healthy volunteers in Korea.
(Ann Dermatol 12(4) 235~237, 2000).

Key Words : MED, Psoriasis, Photosensitivity

Patients with psoriasis usually experience a beneficial effect of sunlight and artificial ultraviolet radiation. However, in a certain percentage of cases the psoriasis is aggravated by sunlight^{1,2}. We usually call it as photosensitive psoriasis⁴. The prevalence of photosensitivity reported among psoriasis patients varies in different studies from about 5.5% to 24%^{2,3}, but the issue of photosensitivity has never been stressed or analyzed in detail.

The minimal erythema dose(MED), which is the threshold dose for burning reactions, is a simple and useful measure of in vivo sensitivity to ultraviolet radiation⁵. It correlates relatively well with sensitivity to sunlight of each individual. In this study we intended to know whether psoriasis patients have increased photosensitivity compared with normal healthy persons by direct comparison of broad-band UVB MED.

MATERIALS AND METHODS

1. Study subjects

A total of 52 psoriasis patients and 39 normal subjects with Fitzpatrick's skin type III, IV or V were selected. Sun-protected area of the low back was taken as an irradiation site. Informed consent as well as a complete medical history was obtained. None had any history of drug hypersensitivity, or abnormal reactions to sunlight.

Received October 28, 1999.

Accepted for publication June 20, 2000.

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*This study was supported by a grant from the Korean Ministry of Health and Welfare(HMP-97-M-1-0013)

2. Radiation source and measurement of MED

A Waldmann UV-800(Waldmann Co., Germany) phototherapy device, including F75/85W/UV21 fluorescent sunlamps, served as a UVB source, having an emission spectrum between 285 and 350nm(peak at 310-315 nm). Irradiance at the skin surface was measured with a Waldmann UV meter(Waldmann Co., Germany).

MEDs were determined by exposure of 1.51.5 cm squares on untanned midback skin on each subject to a series of 10 UVB doses between 30 and 150mJ/cm², using 10mJ/cm² increments. The MED was defined as the lowest UVB dose needed to produce erythema with sharp borders at 24 h after irradiation.

3. Comparison of MEDs

We compared the mean MED values for psoriasis patients and normal healthy volunteers. The statistical analysis of the data was performed by independent sampled t-test. A p-value of less than 0.05 was considered to be significant.

RESULTS

The mean MED of the 52 psoriasis patients was 79.2 20.9 mJ/cm² and that of normal subjects was 64.4 21.9 mJ/cm² respectively(Table 1)(Fig. 1). Psoriasis patients have statistically significant higher values than normal subjects($p < 0.05$). The distribution of MED in psoriasis and normal healthy volunteers was illustrated in Fig. 2.

DISCUSSION

As we have already mentioned, data in the literature regarding photosensitivity of psoriasis is very scant. Even in the dermatological textbook and

Table 1. Minimal erythema doses(MED) obtained from the back of psoriasis patients and normal healthy volunteers. The mean MED of psoriasis patients was significantly higher than that of normal subjects. ($p < 0.05$)

MED(mJ/cm ²)	Psoriasis	Normal
Number	52	39
Average	79.2	64.4
SD	20.9	21.9

(SD : standard deviation)

manuals this form of psoriasis is mentioned only briefly or not at all. However, there is a small but significant number of patients with psoriasis worsened by sunlight⁴.

The photosensitivity may be a specific phenomenon, or be attributed to a Koebner reaction in psoriatic patients with a fair complexion and a tendency to sunburn⁶. It may be related to disorders concomitant with photosensitivity, such as lupus erythematosus⁷, vitiligo⁸, porphyria and so on. Ingestion of photosensitizing drugs is another possibility. Antibiotics such as tetracyclines, sulphonamides and nalidixic acid, phenothiazines, new groups of non-steroidal anti-inflammatory drugs, and methotrexate are well-known photosensitizers.

The minimal erythema dose(MED), which is the threshold dose required to produce visible erythema, has been a simple and useful method to predict skin sensitivities to ultraviolet radiation.

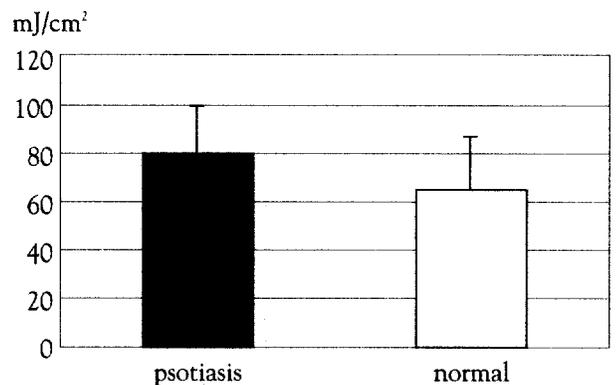


Fig. 1. Comparison of minimal erythema dose of UVB between psoriasis patients and normal healthy volunteers. The mean MED of psoriasis patients was significantly higher than that of normal subjects($p < 0.05$).

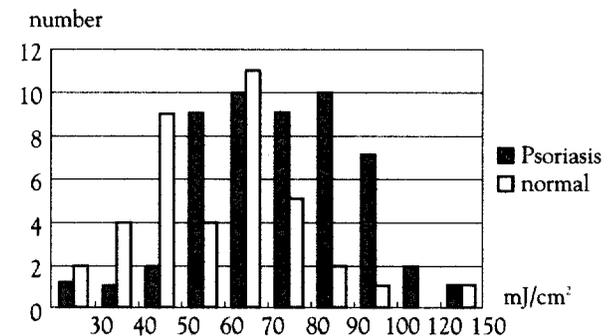


Fig. 2. Distribution of minimal erythema dose(MED) in psoriasis patients and normal healthy volunteers.

Many reports have established a significant correlation between MED and the skin phototype described by Fitzpatrick^{9,10}. On the other hand, some reports have suggested no significant correlation between MED and self-reported burning tendencies in Caucasians¹¹, and at best a weak relationship in Korean¹². However, determination of MED is accepted as baseline procedure to evaluate photosensitivity and regarded as a simple and useful measure of in vivo sensitivities to ultraviolet radiation.

In this study minimal erythema dose(MED) to ultraviolet B was significantly higher in psoriasis patients than that of normal healthy volunteers. It may be due to acclimatization effect¹³. After exposure to sunlight or artificial UV radiation people note less sensitivity to subsequent exposures. Known by various terms such as acclimatization, accommodation, or adaptation, this increase in tolerance is thought to be mediated by hyperplasia of the epidermis with thickening of the stratum corneum and increased pigmentation resulting from production of melanin by stimulated melanocytes¹⁴⁻¹⁶. The tolerance induced by phototherapy with UV radiation provides a good model for acclimatization. Given the use of repeated, increasing exposures of UVB radiation, prolonged UVB treatment is likely to induce almost maximal acclimatization to UVB possible for an individual.

Empirically, most psoriasis patients know the beneficial effect of ultraviolet radiation. Therefore they are likely to expose their bodies to sunlight for improvement of their skin lesions. Furthermore, a certain percentage of patients have past history of phototherapy. These may induce acclimatization effect to ultraviolet radiation in psoriasis patients.

In conclusion, this study demonstrates that psoriasis patients have higher minimal erythema dose to UVB than normal healthy volunteers. Although this may be due to acclimatization effect to ultraviolet radiation, it means photosensitivity is at least not problematic in managing psoriasis.

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