

## Ten-Year Experience of Phototherapy in Yonsei Medical Center

Sang Hoon Park, Seung-Kyung Hann, and Yoon-Kee Park

*Phototherapy with PUVA or UVB has been used to treat a wide variety of diseases such as psoriasis, vitiligo, atopic dermatitis and mycosis fungoides, etc. The present study was performed to investigate the pattern of phototherapy in the phototherapy clinic of Yonsei Medical Center. One thousand six hundred ninety two patients who received PUVA or UVB phototherapy were included in this study. We analyzed the protocols for phototherapy between 1985 and 1994. The number of phototherapy per year increased sharply until 1991 and thereafter it has remained relatively constant. The most common age group at the start of phototherapy was the third decade. The most common indications for PUVA and UVB phototherapy were vitiligo and psoriasis, respectively. Most patients had received less than 50 treatments of PUVA and less than 200 J/cm<sup>2</sup> of cumulative UVA. Most patients had received less than 50 treatments with UVB and cumulative UVB doses were variable. We had not found any malignancy in the skin. Since the maximum safe cumulative doses of UVA or UVB have not yet been established, it is difficult to decide when phototherapy should be discontinued. The data presented in this study needs to be further analyzed in correlation with photoaging and cancer development for the safe usage of phototherapy.*

**Key Words:** PUVA, UVB, phototherapy

Phototherapy is the use of nonionizing electromagnetic radiation to treat diseases. Following the pioneering work of Finsen and others, artificial sources of ultraviolet radiation has been used and psoralen photochemotherapy (psoralen plus ultraviolet A light (PUVA)) and ultraviolet B light (UVB) phototherapy have been used to treat a wide variety of diseases such as psoriasis (Parrish *et al.* 1974; Fisher, 1976), vitiligo (Hann *et al.* 1991), atopic dermatitis (Falk, 1985), and mycosis fungoides (Gilchrest *et al.* 1976), etc.

In 1983, Department of Dermatology of Yonsei University College of Medicine adopted the concepts of ultraviolet therapy and established a phototherapy clinic. To investigate the pattern of phototherapy in the phototherapy clinic of Yonsei Medical Center, we analyzed the protocols for phototherapy of patients who were treated at the phototherapy clinic between 1985 and 1994.

### MATERIALS AND METHODS

#### Patients

One thousand six hundred ninety two patients who received PUVA therapy or UVB treatment at the phototherapy clinic of Yonsei Medical Center from 1985 to 1994 were evaluated. The patient population consisted of 797

Received November 5, 1996

Accepted December 30, 1996

Department of Dermatology, Yonsei University College of Medicine, Seoul, Korea

Address reprint request to Dr. S.K. Hann, Department of Dermatology, Yonsei University College of Medicine, C.P.O. Box 8044, Seoul, Korea

## Ten-Year Experience of Phototherapy in Yonsei Medical Center

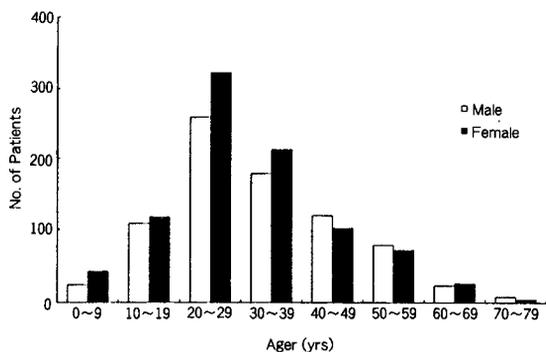


Fig. 1. Age distribution at the time of first phototherapy.

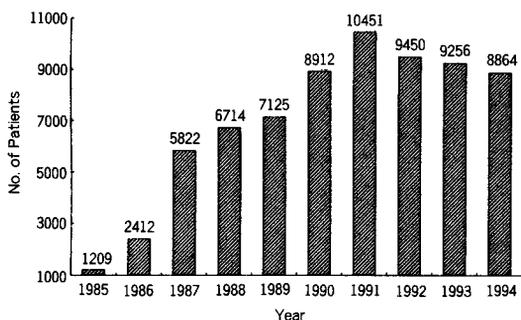


Fig. 2. Incidence of phototherapy per year.

males and 895 females. The median ages of the males and females at the time of first phototherapy were 29.4 and 34.1 years, respectively (Fig. 1).

### Protocols

The following information were obtained from the patients' records: name, date of birth, sex, diagnosis, date of first phototherapy, date of last phototherapy, type of phototherapy, number of treatments and cumulative UV dose.

## RESULTS

The number of patients on phototherapy per year increased sharply until 1991 and

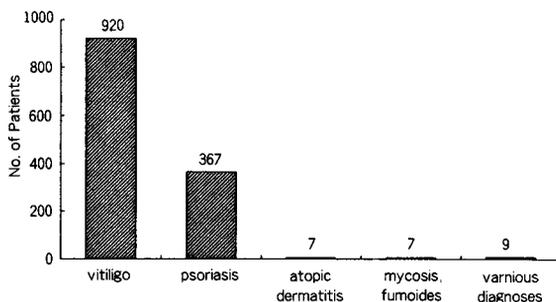


Fig. 3. Indications for PUVA phototherapy.

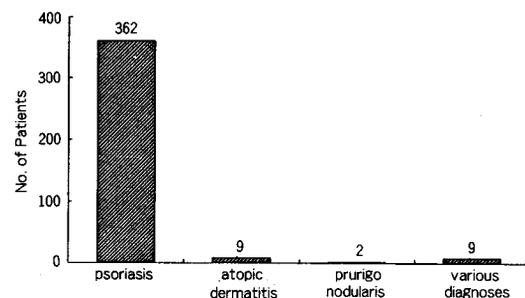


Fig. 4. Indications for UVB phototherapy.

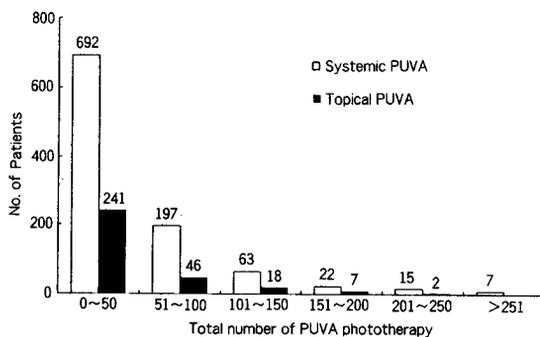


Fig. 5. Total number of PUVA phototherapy.

thereafter it has remained relatively constant (Fig. 2). The most common indication for PUVA therapy was vitiligo (70.2%) followed by psoriasis (28.0%) (Fig. 3). The most common indication for UVB treatment was psoriasis (94.8%) and next was atopic dermatitis (2.4%) (Fig. 4). Most patients (71.2%) had received

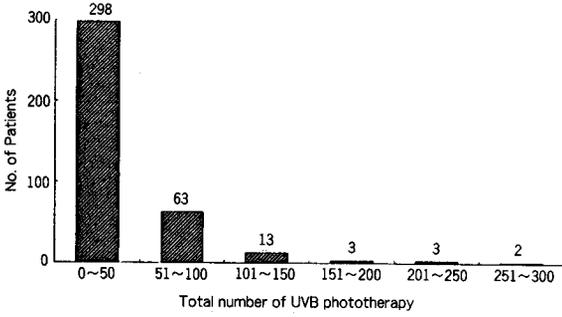


Fig. 6. Total number of UVB phototherapy.

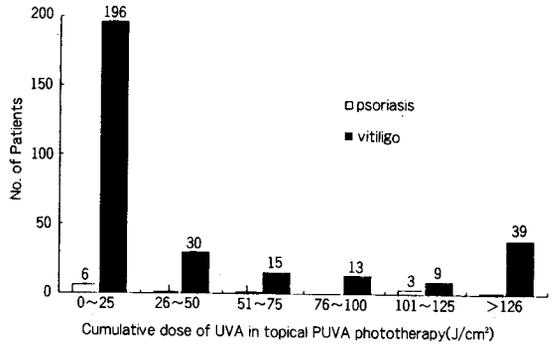


Fig. 9. Cumulative dose of UVA in topical PUVA phototherapy according to diseases.

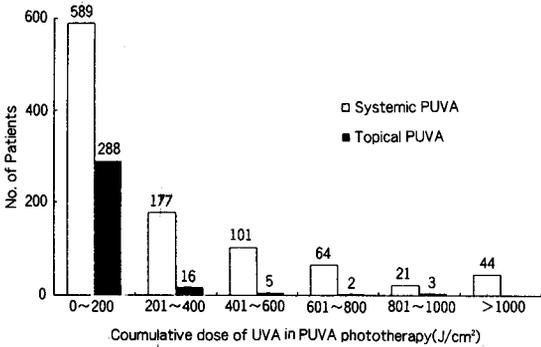


Fig. 7. Cumulative dose of UVA in PUVA phototherapy.

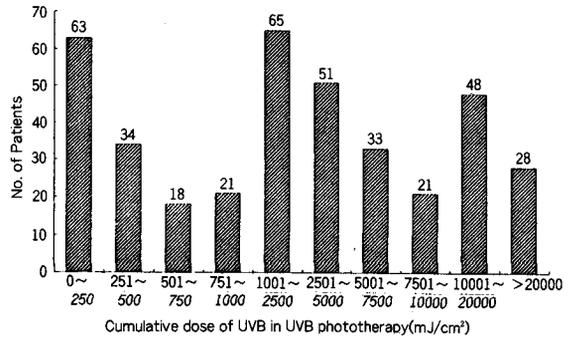


Fig. 10. Cumulative dose of UVB in UVB phototherapy.

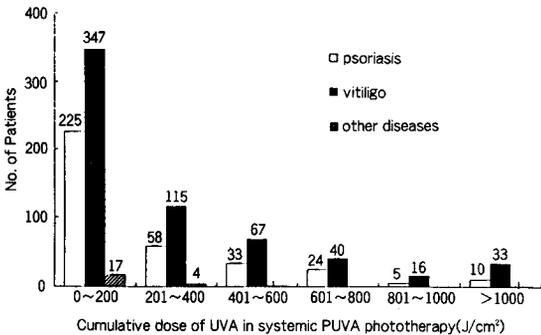


Fig. 8. Cumulative dose of UVA in systemic PUVA phototherapy according to diseases.

less than 50 treatments of PUVA therapy. Twenty four patients on PUVA therapy had received more than 200 treatments, the highest number being 767 in a vitiligo patient (Fig.

5). In case of UVB treatment, most patients (78.5%) had received less than 50 treatments, the highest being 299 in a psoriasis patient (Fig. 6). Regarding cumulative UVA dose in PUVA therapy, most patients (66.9%) had received less than 200 J/cm<sup>2</sup>. However, 44 patients had received more than a total UVA dose of 1,000 J/cm<sup>2</sup>, the highest cumulative dose being 5,276 J/cm<sup>2</sup> in a vitiligo patient (Fig. 7). In systemic and topical PUVA therapy, the highest cumulative UVA doses were 5,276 and 980 J/cm<sup>2</sup>, respectively, in vitiligo patients (Fig. 8, 9). Patients had received variable cumulative doses of UVB, the highest being 86,628 mJ/cm<sup>2</sup> in a psoriasis patient (Fig. 10).

## DISCUSSION

Phototherapy, including PUVA and UVB

treatments, was introduced to Korea in the early 1980's. Ever since the phototherapy clinic opened in our hospital, the number of patients on phototherapy increased sharply year by year until 1991. However, after phototherapy was widely introduced nationwide from late 1980's, the rate of increase in the number of phototherapy patients was not as high as in the early period of phototherapy.

In a study from Sweden, the most common age group was 35~40 years (Lindelof and Sigurgeirsson, 1992). On the other hand, the most common age group at the start of phototherapy were in the third decade (34.3%) in our study. Most patients with psoriasis developed the initial lesions in the third decade of life (Hoede, 1957; Farber and Nall, 1974). Hahm (1983) reported that the peak age group of psoriasis in Korea was the third decade. Although vitiligo may develop at any age, the peak age of onset is between 10 and 30 years (Seghal, 1974). In Korea, the average age at the onset of vitiligo is reported to be 24.2 years by Hann *et al.* (1986), 19.6 years by Park *et al.* (1988), and 21.9 years by Song *et al.* (1994). Age distribution of patients on phototherapy seems to be closely related to those of vitiligo and psoriasis except the first decade in which the use of phototherapy is limited in children patients.

A Swedish study showed that the most common indication for PUVA therapy was psoriasis (64%) and the second most common was pustulosis palmo plantaris (10.5%) (Lindelof and Sigurgeirsson, 1992). In our study, the most common diagnosis for PUVA therapy was vitiligo (70.2%) followed by psoriasis (28%). The total number of diagnoses treated with PUVA therapy was ten.

Dootson *et al.* (1994) reported that the most common indication for UVB treatment in United Kingdom was psoriasis. In our study, the most common diagnosis for UVB treatment was psoriasis (94.8%) and the second most common was atopic dermatitis (2.4%). The total number of diagnoses treated with UVB was twelve.

A Swedish study reported that a great number of patients received less than 50 treatments of PUVA therapy (Lindelof and Sigur-

geirsson, 1992). Similarly, in our study most patients (69.5%) had received less than 50 treatments. In the European PUVA study (Henseler *et al.* 1981) and U.S. Cooperative Clinical Trial (Melski *et al.* 1977), psoriatic patients who cleared required 25.2 and 20 treatments, respectively. Lassus *et al.* (1984) reported that it is necessary to give 60~100 PUVA treatments to patients with vitiligo before the effect can be firmly evaluated. In our study, 377 patients (28.8%) had received more than 50 treatments of PUVA therapy, the highest number being 767 in a vitiligo patient.

Adrian *et al.* (1981) reported that clearing of psoriasis requires an average of 25 UVB treatments. In our study, most patients (78.5%) had received less than 50 treatments, the highest number being 299.

In a study from Sweden, a great number of patients had received less than 200 J/cm<sup>2</sup> of cumulative UVA dose in PUVA therapy and 537 patients had received more than a total UVA dose of 1,000 J/cm<sup>2</sup>, the highest cumulative dose being 6,476 J/cm<sup>2</sup> (Lindelof and Sigurgeirsson, 1992). In our study, most patients (66.9%) had received less than 200 J/cm<sup>2</sup> and 44 patients had received more than a total UVA dose of 1,000 J/cm<sup>2</sup>, the highest being 5,276 J/cm<sup>2</sup> in a vitiligo patient.

Patients had received variable cumulative doses of UVB. However, 28 patients had received more than a total UVB dose of 20,000 mJ/cm<sup>2</sup>, the highest cumulative dose being 86,628 mJ/cm<sup>2</sup> in a psoriasis patient.

PUVA will imply a risk of developing lentigines, actinic keratosis, and squamous cell carcinoma. A large study in USA showed a significant increase of skin cancer following PUVA therapy for 3 or more years (Eskelinen *et al.* 1985; Stern, 1986). We have observed our patients for ten years since the beginning of phototherapy but at the time of this study, we did not find any malignancies in the skin.

Since there is no established safe maximum cumulative dose of UVA or UVB in phototherapy, it is difficult to decide when phototherapy should be discontinued. The data presented in this study needs to be further analyzed in correlation with photoaging and cancer development for the safe usage of photo-

therapy.

## REFERENCES

- Adrian RM, Parrish JA, Momtaz-T K, Karlin MJ: Outpatient phototherapy for psoriasis. *Arch Dermatol* 117: 623-626, 1981
- Dootson G, Norris PG, Gibson CJ, Diffey BL: The practice of ultraviolet phototherapy in the United Kingdom. *Br J Dermatol* 131: 873-877, 1994
- Eskelinen A, Halme K, Lassus A, Idanpaan-Heikkila J: Risk of cutaneous carcinoma in psoriatic patients treated with PUVA. *Photodermatology* 2: 10-14, 1985
- Falk ES: UV-light therapies in atopic dermatitis. *Photodermatology* 2: 241-246, 1985
- Farber EM, Nall ML: The natural history of psoriasis in 5600 patients. *Dermatologica* 148: 1-18, 1974
- Fisher T: UV-light treatment of Psoriasis. *Acta Derm Venereol (Stockh)* 56: 473-479, 1976
- Gilchrest BA, Parrish JA, Tanenbaum L, Haynes HA, Fitzpatrick TB: Oral methoxsalen photochemotherapy of mycosis fungoides. *Cancer* 38: 683-689, 1976
- Hahn JH: Clinical observation of Psoriasis. *Korean J Dermatol* 21: 507-512, 1983
- Hann SK, Cho MY, Im S, Park YK: Treatment of vitiligo with oral 5-methoxypsoralen. *J Dermatol* 18: 324-329, 1991
- Hann SK, Park YK, Whang KC, Kim HJ: Clinical study of 174 patients with generalized vitiligo. *Korean J Dermatol* 24: 798-805, 1986
- Henseler T, Wolff K, Honigsmann H, Christophers E: The European PUVA study (EPS): Oral 8-methoxypsoralen photochemotherapy of psoriasis. A cooperative study among 18 European centres. *Lancet* 1: 853-857, 1981
- Hoede K: Zur Frage der Erbllichkeit der Psoriasis. *Hautarzt* 8: 433-438, 1957
- Lassus A, Halme K, Eskelinen A, Ranki A, Puska P, Salo O: Treatment of vitiligo with oral methoxsalen and UVA. *Photodermatology* 1: 170-173, 1984
- Lindelof B, Sigurgeirsson B: PUVA treatment in Sweden. *Acta Derm Venereol Suppl (Stockh)* 169: 3-6, 1992
- Melski JW, Tanenbaum L, Parrish JA, Fitzpatrick TB, Bleich HL: Oral methoxsalen photochemotherapy for treatment of psoriasis: A cooperative clinical trial. *J Invest Dermatol* 68: 328-335, 1977
- Park KC, Youn JI, Lee YS: Clinical study of 326 cases of vitiligo. *Korean J Dermatol* 26: 200-205, 1988
- Parrish JA, Fitzpatrick TB, Tanenbaum L, Pathak MA: Photochemotherapy of psoriasis with oral methoxsalen and long-wave ultraviolet light. *N Engl J Med* 291: 1207-1211, 1974
- Seghal VN: A clinical evaluation of 202 cases of vitiligo. *Cutis* 14: 439-445, 1974
- Song MS, Hann SK, Ahn PS, Im SB, Park YK: Clinical study of vitiligo. *Ann Dermatol* 6: 22-30, 1994
- Stern SR: PUVA carcinogenesis after ten years: prospect and retrospect. *Photodermatology* 3: 257-260, 1986