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PSORIASIS TREATMENT AND A DAY-CARE CENTRE: CLINICAL ASPECTS AND AN ATTEMPT AT A COST-BENEFIT ANALYSIS

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Abstract. The practical results of day-care centre treatment of psoriasis have been studied. Patients referred to the centre are generally those where the skin disease covers substantial body areas. The main treatment has been UVB. UVB plus dithranol or PUVA has been used on patients who have failed to respond to UVB alone. With UVB therapy alone, 263/328 patients healed with a median to healing time of 8 weeks, and 9 weeks to relapse. 34/60 patients with a previously poor response to UVB healed on UVB plus dithranol. Median time to healing was 8 weeks and time to relapse, 12 weeks. 24 patients were treated with PUVA, as they had had a poor earlier response to UVB. All healed with a median time to healing of 12 weeks and 25 weeks to relapse. 3.3% of the patients fit for work have at some time during the treatment been off work due to their psoriasis. The cost for this type of treatment is about one-fifteenth of the cost of treatment on a hospital ward.

Many reports have appeared concerning the efficacy of various regimens for psoriasis. These studies have usually been performed in specialized clinics and the patients have been aware of the fact that they have taken part in a scientific study. In this way it is possible to obtain a relatively reliable measure of the effectiveness of the treatment used under the actual conditions of the investigation. It should be remembered, however, that the patient's normal habits do not conform to the very strict instructions that are given in a controlled investigation. Most patients find it tiresome to go through a very tedious treatment programme day after day, year after year. Also the long-term value of a particular treatment necessitates observing the progress of a number of patients for a longer period than usually is the case in clinical trials.

In 1979 we opened a new psoriasis treatment centre in Gothenburg, Sweden. The centre is equipped with two saunas, eight cabins for UVB treatment and two PUVA cabins. The number of treatments has increased gradually and is now about 20 000 treatments per year. The staffing at the centre comprises one dermatologist working 8–12 hours per week, two fulltime nurses, and 6½ other personnel. The treatment has, as far as possible, been given on a self-service basis with the nurses mainly functioning as instructors. The patient has been advised to come to the treatment centre preferably daily, but at least three times a week. For the PUVA treatments appointments have been necessary, but otherwise the patients are allowed to come whenever they like between 10 am and 8 pm on 5 days a week—except Friday, when the unit closes at 6 pm. If the patient's attendance at the treatment centre is too irregular, he is advised either to come at least three times a week, or else to stop the treatment.

After the treatment centre had been in operation for 2 years we carried out a follow-up study to evaluate this type of medical care for psoriasis from different points of view. This paper reports our findings.

MATERIAL AND METHODS

The main treatment has been irradiation with UV-B together with some additive dithranol. PUVA has been used mainly when other methods of treatment have failed.

The UVB treatments have been given in treatment boxes 130 cm square equipped with fourteen 40 W and fourteen 20 W fluorescent sunlamps (Philips type TL 12). The lamps are mounted in front of large curved reflectors to give added radiation in the forward direction. These lamps emit a continuous spectrum of 270–400 nm with a peak at 313 nm, together with the mercury resonant lines in the UVB, UVA and visible regions. The treatment schedule has been to begin with an exposure time of about 30 sec (which is approximately one minimal erythema dose (MED) in the fair Swedish skin type). This is increased at regular intervals in order to maintain a mild erythema. The final radiant exposure (dose) is dependent on individual response.

The UVB patients were asked to come for treatment five times a week and to continue in that way until healing was achieved. If no therapeutic relief was obtained within 3 months, we then changed to some other type of treatment.

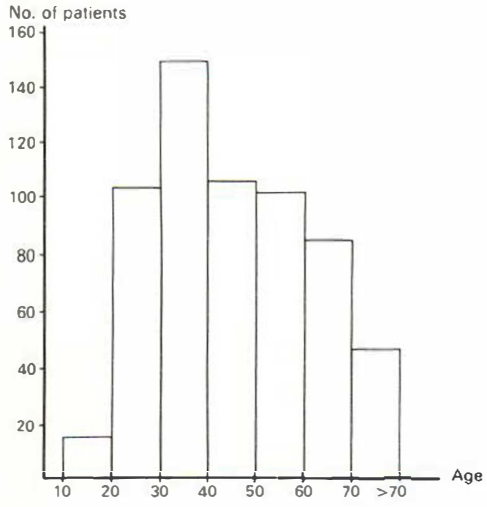

Fig. 1. Diagram showing age distribution of patients treated at day-care centre.

The standard PUVA regimen has been followed with oral administration of 0.6 mg 8-methoxypsoralen per kg body weight. A PUVAMATIC light cabinet equipped with 24 UV-A fluorescent lamps (Philips type TL 09) was used. The emission spectrum of the lamps peaks around 351 nm in the UVA region. The fluoresecent lamps are mounted in a square, thereby permitting whole-body irradiation. An ultraviolet radiation detector continuously monitors the UVA output. Treatment was started with one, two or three Joules per square centimetre (Jcm^{-2}), depending on skin type. If there was no discomfort or erythema at the time of the next treatment the dose was increased by 1 Jcm^{-2} for each treatment up to a maximum of 15 Jcm^{-2}. The 8-MOP was ingested 1½ hours before treatment. PUVA treatments were given twice weekly until healing occurred.

A total of 604 patients were registered at the day-care centre after 18 months of operation; 343 were men and 261 were women. The number of patients in different age-groups is shown in Fig. 1. There were 108 patients who did not complete a course of treatment. The extension of psoriasis was determined on admission to the unit (see Fig. 2).

RESULTS

Of the 604 patients who have been treated, 580 have received initially UVB and/or dithranol therapy. The remaining 24 received PUVA directly as they had a history of poor response to conventional treatment. During the initial period 35/580 were treated 5 days per week, 365/580 patients 3 or 4 days per week, and 180/580 twice a week or less. Of the latter group 108 eventually ceased treatment, while 72 received UVB therapy over a long period, although very irregularly. Of the 400 patients attending for treatment regularly, 328 received only UVB treatment, 60 received UVB + Dithranol and 12 received other forms of treatment. In the UVB-treated group 263 of the 328 patients (80%) healed, while 65 showed little or no improvement. The median time to healing was 8 weeks (24 treatments). Of the 263 patients who healed completely on UVB treatment, 212 healed during the first 18 months of our follow-up period. These 212 were selected for an investigation of the remission time. So far, 22 patients have not reported back, but of the 190 patients seen, the median time to relapse was 9 weeks. The distribution of time to relapse is given in Fig. 3.

Sixty psoriatic patients were treated with UVB + Dithranol primarily as they had a history of insufficient response to UVB alone when given earlier. Of these 60 patients, 34 were cured, with a median time to healing of 8 weeks (27 treatments). Thirty of these 34 patients were cured during the first 18 months of the follow-up period. The distribution of time to relapse is shown in Fig. 3. The median time to relapse was 12 weeks.

There were 24 patients who were given PUVA initially, as the response to conventional therapy previously had been poor. All of these patients were cured with PUVA, with a median time to healing of 12 weeks, corresponding to 24 treatments. The me-

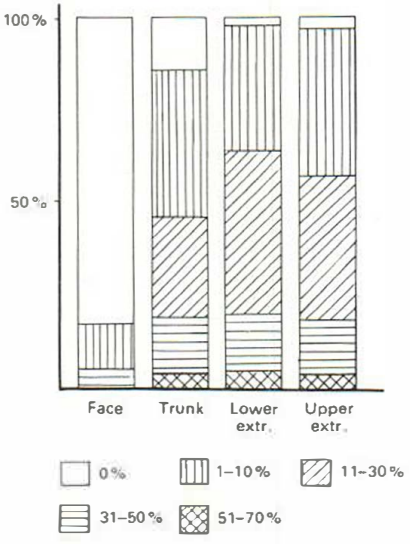

Fig. 2. Degree of involvement of psoriasis at the time of admission, expressed as a percentage of skin surface of each part of the body.

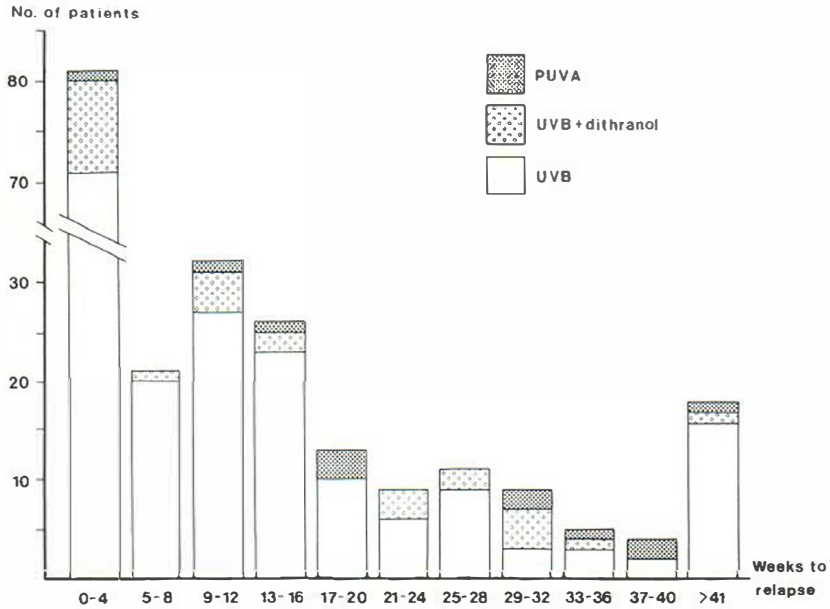

Fig. 3. Time, in weeks to relapse, among patients cured during the first 18 months and treated with UVB, UVB plus dithranol, and PUVA.

dian UVA dose required was 110 Jcm^{-2}. Twenty-one patients were cured during the first 18 months of the investigation and of these, 12 have so far returned, with median time to relapse of 25 weeks (see Fig. 3).

Sixty-five patients were considered UVB failures despite adequate frequency of attendance. Of this group of patients 33 were given UVB with additional Dithranol, whilst 32 received PUVA. The extension of skin involvement in the two groups was about the same. Of the 33 patients in the UVB + Dithranol group, 4 were cured, 14 improved, 12 showed no change and 3 became worse. Of the 32 UVB failures who were put on PUVA, 17 healed, 11 improved, 2 showed no change, and 2 deteriorated.

For all patients who received UVB therapy and were followed for more than one year the median annual number of treatments was 35. The distribution of the number of treatments per patient per year is shown in Fig. 4.

Only 17 of the 522 patients (3.3%) who are employed have at some time during treatment been off work due to their psoriasis.

A presumably UV-induced herpes simplex has been seen in 7 patients.

UVB treatment was not given to patients receiving chlorpromazine, demethylchlortetracycline or doxycycline, although other drugs reported to produce phototoxic or photoallergic reactions were allowed. In Table I the number of patients who started taking such drugs during a session of UVB treatment is noted. As can be seen in this table, only two photoreactions were produced; these patients exhibited a severe burn of a phototoxic type. There was no reaction on the face, as this area was shielded during UVB treatment.

The cost of running the treatment centre, exclusive of rent for the premises, was about 800 000 Swedish crowns per year (5 Sw kr = 1 US $). This includes the salaries of the staff, cost of mainte-

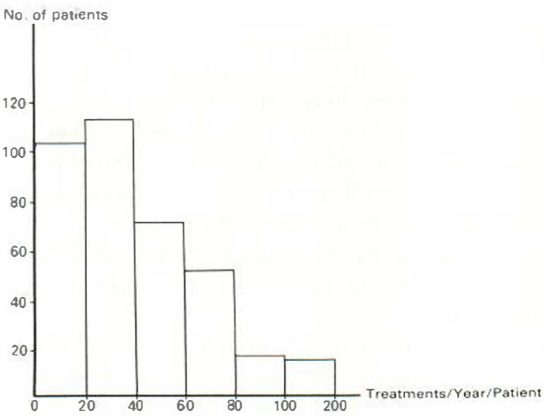

Fig. 4. Number of UVB treatments per patient per year for psoriasis patients followed for more than one year.

Table 1. *Reactions to various drugs reported to cause UV-light reactions*

Drug	No. of patients receiving the drug	No. of patients reacted
Bendroflumethiazidum	3	0
Hydrochlorothiazidum	6	0
Furosemidum	1	0
Chlortalidonum	2	0
Tricyclic antidepressives (Clomipraminum, Amitriptylinum)	4	0
Glibenclamidum	1	0
Chlordiazepoxidum	1	0
Carbamazepinum	1	0
Trimethoprimum–sulfamethoxazolum	1	1
Azapropazonum	1	1

nance and replacement of equipment, electricity, ointments and other utilities. The rental charge is 500 Swedish crowns per square meter per year and so the total annual cost of running the centre is 1.4 million Swedish crowns, or 85 Swedish crowns per treatment (drop-outs and irregular patients excluded). The Swedish Health Care system requires that the patient pay 15 Swedish crowns per treatment up to a maximum of 600 Swedish crowns per year and after that obtains free treatment. When the patient sees the doctor at the treatment centre once a month he pays 25 Swedish crowns. Generally the patient is working full time even during the period of active treatment.

DISCUSSION

It is not sufficient to know only that an antipsoriatic modality is effective in a certain proportion of patients. It is also important to know how many treatments are necessary to achieve satisfactory healing, how long the time to relapse is, whether the patient has to be off work in order to be treated, and the financial burden for the patient and/or the community. In the present study we have tried to gain an integrated view of psoriasis treatment at day-care centres.

As far as UVB treatment is concerned, we observed a healing rate of about 80% of patients with an adequate attendance frequency. The time to relapse amongst those who have returned is about 9 weeks. These results are consistent with the findings of previous investigations (1, 2, 4, 5, 9, 10). Thus it seems that UVB alone can give good results among the majority of psoriasis patients. Of course, physicians referring patients to the centre know that the most commonly used modality is treatment with UVB radiation. Consequently, patients with light-sensitive skin diseases are probably not referred to the centre. However, it is our experience that most light-sensitive psoriatics respond satisfactorily to UVB radiation, providing the dose increments are small.

Desquamation has been achieved mainly by using a sauna which also serves to hydrate the horny layer. This is probably important in optimizing the optical properties of the skin, perhaps having the same effect as a lubricant (8). The sauna also gives a sense of well being, which is important if the patient has to come regularly for treatment.

UVB + Dithranol was used on 60 patients with a history of poor response to UVB alone: 34 of these patients healed. The median time to relapse was about the same as for the UVB-alone treatment group. However, it should be remembered that these patients had had a poor response to UVB earlier. We found it both impractical and expensive to combine UVB- and Dithranol-treatment with tar baths.

PUVA treatment is used by us mainly when other methods of treatment have failed. At the treatment centre we generally start with PUVA treatment if the patient has a history of poor response to other treatments; this has been the case for 24 patients during the period. The therapeutic results are excellent.

The 65 patients who did not heal with UVB treatment could choose between PUVA and the combination of UVB and Dithranol. Thirty-three patients chose UVB + Dithranol, whilst 32 opted for PUVA. The results were markedly better in the PUVA group than in the UVB + Dithranol group. There was no significant difference between the two groups at the start of therapy regarding involvement of the skin. It seems therefore that a change to PUVA treatment results in a better response than does the mere addition of Dithranol to UVB treatment.

In a world of deteriorating economy it is necessary to decide what price we are willing to pay for proper psoriasis treatment. Certainly the cost for day-care centre treatment of psoriasis is low compared with treatment on a hospital ward (3, 11, 12).

Table II. *The overall cost consists of two items: Cost of treatment and the value of loss of production. The latter item is estimated by sickness compensation*
Skr = Swedish crowns

	Hospital ward	Climatic therapy	Day-care centre	Home solarium treatment
Cost of treatment	2 periods × 20 days × 1 200 Skr/day = ~48 000	2 periods × 6 500 Skr (travel and accommodation = ~13 000	2 periods × 24 treatments × 85 Skr/treatment = ~4 000	<500 Skr
Sickness compensation (200 Skr/day)	2 periods × 20 days × 200 Skr/day = ~8 000	2 periods × 28 days × 200 Skr/day = ~11 000	Patient working	Patient working
Total	~56 000 Skr	~24 000 Skr	~4 000 Skr	<500 Skr

On the basis of our experience of treatment in a hospital, at a day-care centre or in southern geographical altitudes (climatic therapy), we have constructed a "model psoriasis patient", he is a middle-aged, high skilled factory worker with an annual income of 80 000 Swedish crowns. According to the Swedish Health Care system his sickness compensation is 200 Skr/day (5 Swedish crowns = 1 $). This patient is treated in hospital for 20 days, or in a day-care centre for 2 months, or with climate therapy for 4 weeks. The patient will be likely, with all types of treatment, to relapse after 2 months and he may experience moderate symptoms for some considerable time. The cost in 1981 prices for two such treatment cycles per year will be approximately 56 000 Swedish crowns for treatment on a hospital ward, 24 000 Sw. kr. for climatic therapy and 4 000 Sw. kr. at a day-care centre (see Table II). Note that day-care centre treatment does not require the patient to stay off work. However, home solarium treatment may cost less than 500 Sw. kr. per year.

In the future, day-care centres should perhaps be used as "educational units", where the patients become acquainted with the equipment and the different ointments. When they are almost healed they can continue on their own at home with ointments or home solarium therapy at the lowest possible cost for the community. Of course, it will be necessary for the UV-treated patients to visit a dermatologist at regular intervals because of the potential carcinogenic nature of ultraviolet radiation, particularly the UVB component. As shown in another study (6), this does not seem to be a serious problem: nevertheless the risk of skin cancer may be minimized if the patient is reviewed by a dermatologist twice a year. We have shown in related work (7) that the median biologically effective UVB dose resulting from medical phototherapy is around 4 Jcm^{-2}/year, which is of the same order of magnitude as for an outdoor worker in Sweden. However, about 20% of patients receive more than twice this dose and must be followed carefully.

Our day-care centre serves the greater Gothenburg area, but 75% of patients come from the city itself, which has a population of about 430 000. The centre caters for about half of the treatments given in the Gothenburg area. We now have about 900 patients registered at the day-care centre, with new patients coming all the time. In Gothenburg there are about 10000 psoriatic patients, 7% of whom attend our treatment centre and about 7% attend other units; i.e., about 15% of the psoriasis patients in the Gothenburg area visit day centres for the treatment of their psoriasis.

A very small proportion of the patients have been off work as a result of their psoriasis, despite the severity of the disease in general. Treatment given at a day-care centre offers an opportunity for patients to treat lesions that cover a substantial area of the body surface, yet still work and lead a normal life. The financial burden on society is considerably less than alternatives such as hospitalization or climatic therapy. We feel that psoriasis, per se, is very seldom a reason for hospitalization. In the future, day-care centres operating along the lines

described here might be a way of giving high quality treatment at a considerable saving vis-à-vis conventional hospital treatment.

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REFERENCES

1. Adrian, R. M. Parrish, J. A., Momtaz, T. K. & Karlin, M. J.: Outpatient phototherapy for psoriasis. Arch Dermatol *117:* 623, 1981.
2. Boer, J., Schothorst, A. A. & Suurmond, D.: UVB phototherapy of psoriasis. Dermatologica *161:* 250, 1980.
3. Cram, D. L. & King, R. I.: Psoriasis day care centres. JAMA *235:* 177, 1976.
4. Fischer, T.: UV-light treatment of psoriasis. Acta Dermatovener (Stockholm) *56:* 473, 1976.
5. Larkö, O. & Swanbeck, G.: Home solarium treatment of psoriasis. Br J Dermatol *101:* 13, 1979.
6. — Is UVB therapy of psoriasis safe? To be published.
7. Larkö, O. & Diffey, B. L.: Natural UVB radiation received by people with outdoor, indoor, and mixed occupations. In press.
8. LeVine, M. et al: Reflectance of psoriatic plaques. Abstract presented at the 7th Annual Meeting of the American Society of Photobiology, June 24–28, 1979. American Society for Photobiology, p. 175, 1979. Asilomar, Calif. Program and Abstracts.
9. LeVine, M. & Parrish, J. A.: Outpatient phototherapy of psoriasis. Arch Dermatol *116:* 552, 1980.
10. Petrozzi, J. W., Barton, J. O., Kaidbey, K. K. & Kligman, A. M.: Updating the Goeckerman regimen for psoriasis. Br J Dermatol *98:* 437, 1978.
11. Roenigk, H. H.: Cost-effectiveness of PUVA. JAMA *245:* 1941, 1981.
12. Watson, W. & Farber, E. M.: Psoriasis day-care centre at Stanford: Anthraline regimen. *In* Farber, E. M. & Cox, A. J.: Psoriasis. Proceedings of the Second International Symposium 1976, 455 pp, Yorke Medical Books, New York, 1977.

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