

itself or its very close surrounding. The graft taken from the denuded area did not grow new hairs, and so the MPB process of the hair follicle is not reversed by a change in its location on the human body.

REFERENCES

1. Dorsey, B.: Baldness: Its cause and prevention. Los Angeles, De Vorss & Co., 1939.
2. Kessler, E.: Zur Technik der "Glatzenoperation". *Ärztl Prax* 11: 176, 1959.
3. Kessler, E.: Der heutige Stand der Frontalotomie. *Ärztl Prax* 13: 494, 1961.
4. Kessler, E.: "Bilanz der Galeatomie". *Aest Med (Berlin)* 15: 208, 1966.
5. Light, A.: Histological study of human scalp exhibiting various degrees of non-specific baldness. *J Invest Dermatol* 13: 53, 1949.
6. Nordström, R.: Hair transplantation. The use of hairbearing compound grafts for correction of alopecia due to chronic discoid lupus erythematosus, traumatic alopecia, and male pattern baldness. *Scand J Plast Reconstr Surg, Suppl.* 14, 1976.
7. Orentreich, N.: Autografts in alopecias and other selected dermatological conditions. *Ann NY Acad Sci* 83: 463, 1959.
8. Pontén, B.: The results of frontal galeotomies for loss of hair. *Acta Chir Scand* 126: 406, 1963.
9. Szasz, T. & Robertson, A.: A theory of the pathogenesis of human baldness. *Arch Dermatol* 61: 34, 1950.
10. Wadel, J.: Untersuchungen über den prämaternen chronischen Haarausfall. *Wien Klin Wochenschr* 46: 1383, 1933.
11. Wadel, J.: Neue Untersuchungen über die Entstehung der prämaternen Alopecie. *Arch Dermatol Syphilol* 172: 128, 1935.
12. Young, M.: Anatomical factors in senile alopecia; experimental production of baldness. *Anat Rec* 97: 378, 1947.

Liver Biopsy in PUVA-treated Patients

H. Zachariae, K. Kragballe and H. Sogaard

*Department of Dermatology, Marselisborg Hospital,
and Department of Pathology, Aarhus
Kommunehospital, University of Aarhus,
Aarhus, Denmark*

Received October 16, 1978

Abstract. Seventy-five liver biopsies were performed in 30 psoriatics and 5 patients with mycosis fungoides undergoing treatment with photochemotherapy with 8-methoxypsoralen and UVA light. All patients had pre- and post-

PUVA biopsies, the latter after one year. Five psoriatics had a further biopsy after 2½ years of treatment. No statistically significant differences were found between biopsies taken before and after treatment.

Key words: Photochemotherapy; 8-methoxypsoralen; Liver biopsy

Within recent years, PUVA, i.e. photochemotherapy with psoralens and subsequent exposure to long-wave ultraviolet light (UVA), has become an alternative to methotrexate for the treatment of severe psoriasis. One of the main reasons for preferring PUVA has been methotrexate's well-known liver toxicity (1, 3, 10). Psoralens in double-blind acute toxicity studies on human volunteers (6) seem to have disproved early concern about hepatotoxicity (2). Present clinical experience (4, 8) is generally in accordance with the experimental studies. However, occasional transient elevation of serum transaminases has been reported (5, 7), and as no long-term clinical studies including liver biopsies have hitherto been published, we found it reasonable to add liver biopsies to the control of patients on PUVA. The present paper reports on results of biopsies made on 35 patients treated from 1 to 2½ years with PUVA.

MATERIAL AND METHOD

Our investigations were carried out on 75 liver biopsies from 30 psoriatics and 5 patients with mycosis fungoides. All had a pre-PUVA biopsy taken, and a further one after 1 year's treatment. 5 psoriatics also had a third biopsy taken, 1½ years later. PUVA was administered according to generally established treatment schedules with 8-Methoxypsoralen (Meladinine®) administered 2 hours prior to ultraviolet light. Initially most patients received treatment 3 to 4 times a week with a reduction in frequency following clinical improvement. The normal dosage per treatment varied from 30 to 60 mg according to body weight. The average methoxalen dosage after one year was 2480 mg, varying between 1000 and 9200 mg.

All biopsies were obtained by the Menghini technique using a 70×1.9 mm needle. Sections were cut 5 µm thin and stained with haematoxylin-eosin and van Gieson. Fatty infiltration, nuclear variability, periportal inflammation, focal necrosis, cholestasis, fibrosis and cirrhosis were estimated. Except for cirrhosis, each histological abnormality was graded as 1 (not present), 2 (slight), 3 (moderate) or 4 (severe). Cirrhosis was interpreted as either present or absent. The grading was performed by one of us without knowledge of the clinical data.

All patients were asked to supply information upon their alcohol consumption. No restriction of alcohol intake was required. It is not unlikely, however, that a certain reduction in alcohol intake may have taken place between the

Table I. Comparison of liver biopsies from 35 patients prior to PUVA treatment, with biopsies taken from the same patients after one year of treatment

	Average grading $\pm$ S.D.					Average dosage (mg)
	Steatosis	Nuclear variability	Periportal inflammation	Focal necrosis	Fibrosis	
Pre-PUVA	1.86 $\pm$ 0.71	2.06 $\pm$ 0.46	1.56 $\pm$ 0.71	1.74 $\pm$ 0.63	1.14 $\pm$ 0.50	2 480
Post-PUVA	1.87 $\pm$ 0.76	1.94 $\pm$ 0.42	1.56 $\pm$ 0.73	1.57 $\pm$ 0.71	1.20 $\pm$ 0.59	

first and latest biopsy, due to the knowledge that alcohol can aggravate the disease.

Besides liver biopsies, all patients had blood tests at intervals of 1 to 3 months. The laboratory investigations for evaluating liver damage were serum glutamic pyruvic transaminase (SPGT) and alkaline phosphatases.

Six patients had previously been receiving methotrexate; 4 had earlier had potassium arsenite.

RESULTS

The data on the histological grading of biopsies taken prior to and following one year of PUVA treatment are shown in Table I. The number of pathological findings was high, while the degree of each pathological parameter generally was low, mainly in the order of grade 2. No statistically significant differences could be found between the two groups of biopsies.

Cirrhosis was found in one pre-PUVA biopsy. This patient had once been treated with methotrexate. His second biopsy, however, showed no signs of cirrhosis. In another patient who had not been treated with either methotrexate or potassium arsenite, a mild cirrhosis was found in the second biopsy. In this case mild fibrosis has already been found in her first biopsy, and had increased from grade 2 to grade 3. The stated alcohol consumption was below three drinks per week.

The results of serial biopsies appear in Table II. They show little change. Neither in the serial biopsies nor in patients with only two biopsies did the difference between gradings exceed one grade. None of the laboratory data indicated any liver toxicity caused by the PUVA treatment.

DISCUSSION

The high incidence of pathological liver biopsies tallies with previous studies on psoriatics (1, 10). As was found in these early studies, most changes have been of a mild nature. Our data give no firm indication of liver damage induced by PUVA treatment. Our only concern is one patient, in whom a mild cirrhosis appeared in her latest biopsy. This finding, however, should be weighed against the finding in another patient in whom cirrhosis was established in the first biopsy, but not found in the specimen taken one year later.

Although the observation period for most patients has been limited to one year, we do not consider it justified to include liver biopsies in the control of new patients receiving PUVA. We will, however, continue to observe those patients reported here as long as they continue with treatment intended to run for another 3-year period. This control

Table II. Results of serial liver biopsies in 5 psoriatics on PUVA treatment

All findings are graded 1 to 4. Grade 1 means 'no pathological change'

Pat. no.	Age	Sex	Steatosis			Nuclear variation			Periportal inflammation			Focal necrosis			Fibrosis			Dosage after 2½ years (mg)
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
1	30	F	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	3 640
2	39	F	2	2	1	2	2	1	2	2	1	1	2	1	2	1	1	8 720
3	35	F	1	1	1	2	1	2	1	1	1	2	1	1	1	1	1	1 560
4	30	F	1	2	1	2	2	2	1	2	1	1	2	1	1	1	1	3 000
5	44	M	2	3	2	2	2	2	2	2	2	2	1	2	1	2	1	2 760

will be carried out because long-term drug therapy could lead to changes not observed in early biopsies (10).

REFERENCES

1. Dahl, M., Gregory, M. & Scheuer, P.: Liver damage due to methotrexate in patients with psoriasis. *Br Med J*: 625, 1971.
2. Elliot, J.: The treatment of vitiligo with 8-methoxypsoralen. *South MJ* 49: 691-693, 1956.
3. Nyfors, A., Lee, J. & Maibach, H.: Light and electron microscopy of liver biopsies from long-term methotrexate treated psoriatics and controls. *Proc 19th Scand Congr Derm*, Oslo 1971.
4. Parrish, J.: Photochemotherapy of psoriasis. *Arch Dermatol* 112: 35-36, 1976.
5. Swanbeck, G., Thyresson-Hök, M., Bredberg, A. & Lambert, B.: Treatment of psoriasis with oral psoralen and long wave ultraviolet light. *Acta Dermatovener (Stockholm)* 55: 367-376, 1975.
6. Tucker, H.: Clinical and laboratory tolerance studies in volunteers given oral methoxalen. *J Invest Dermatol* 32: 277-280, 1959.
7. Weismann, K., Howitz, J. & Bro-Jørgensen, A.: Treatment of resistant psoriasis with oral 8-methoxypsoralen and long wave ultraviolet light (PUVA). *Acta Dermatovener (Stockholm)* 57: 73-76, 1977.
8. Wolff, K., Hönigsmann, H., Geschnait, F. & Konrad, K.: Photochemotherapie bei Psoriasis. *Deutsche Med Wschr* 100: 2471-2477, 1975.
9. Zachariae, H. & Søgaard, H.: Liver biopsy in psoriasis—a controlled study. *Dermatologica* 146: 149-155, 1973.
10. Zachariae, H., Grunnet, E. & Søgaard, H.: Liver biopsy in methotrexate treated psoriatics—a reevaluation. *Acta Dermatovener (Stockholm)* 55: 291-296, 1976.

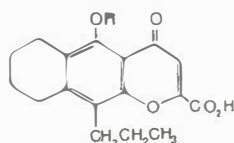
Clinical Trial of a New Chromone Compound for Systemic Treatment of Atopic Dermatitis

Poul Ølholm Larsen and Finn Schultz Larsen

Department of Dermatology, Odense University Hospital, DK-5000 Odense C., Denmark

Received October 12, 1978

Abstract. In a double-blind group comparative study, 14 adults with atopic dermatitis were treated systemically for 6 weeks with a new anti-allergic chromone compound (FPL 57787) 6 mg four times a day. A similar group of 13 adults was given placebo. Both groups improved during



FPL 57787

Fig. 1. Structural formula of FPL 57787.

the trial in all the clinical assessments without significant differences, but there was a tendency to a decreased use of local treatment (hydrocortisone butyrate) in the active group during the trial. There were no drug-related complaints, but one patient in the active group had transiently elevated liver enzyme levels. Further investigations are warranted.

Key words: Atopic dermatitis; Chromone-carboxylic acid; Systemic treatment; Double-blind trial

In a recently published study (2) 10% sodium chromoglycate in white soft paraffin was shown to be effective as a local treatment for atopic dermatitis in children. We have tried a new member of the chromone group for systemic treatment of atopic dermatitis in adults.

MATERIAL AND METHODS

The new drug is a chromone-2-carboxylic acid (FPL 57787) with the empirical formula $C_{17}H_{18}O_5$ (Fig. 1). The drug possesses anti-allergic activity following intravenous and intestinal administration using passive cutaneous anaphylaxis in the rat. In vitro, FPL 57787 inhibits antihuman IgE-induced histamine release from human basophil leukocytes (IC_{50} of 6×10^{-5} M). Sodium chromoglycate is inactive in this in vitro system and always when given by the intestinal route (1).

The material consisted of 27 patients suffering from atopic dermatitis. All were above 18 years of age and selected in accordance with the criteria laid down by Hanifin & Lobitz (3). The study was performed double-blind and the two groups were comparable as to age, sex, severity and duration of their disease. Only women using effective contraceptives were accepted as participants. On admission each patient was allocated at random to one of two treatment groups. One group (14 patients) received tablets of 6 mg FPL 57787 four times a day for 6 weeks and the other group (13 patients) was given placebo. All patients received placebo for 2 weeks before and 2 weeks after this period. Previous treatment was stopped. The patients were seen once a week and each time were given 50 g of hydrocortisone butyrate 0.1% in cream (Locoid®, Gist-Brocades) and asked to use topical treatment only to relieve discomfort. Three regions were selected for evaluation of scaling, colour, lichenification, general assessment of the dermatitis and severity of itch.

The following laboratory investigations were performed