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The Effects of Photochemotherapy on Endocrine Secretion in Patients with Psoriasis

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Received December 8, 1980

Abstract. Blood and urine hormone levels were measured in four patients with psoriasis up to 24 hours after their first PUVA treatment. The changes were minimal and unlikely to explain the feeling of well-being experienced after PUVA therapy.

Key words: Photochemotherapy; Endocrine secretion in Psoriasis

The feeling of well-being many people experience after sunbathing or exposure to ultraviolet (UV) radiation from an artificial source precedes the appearance of tanning. Likewise, patients with psoriasis treated with PUVA (8-methoxy-psoralen (8-MOP) and long-wave UV (UVA)) have reported similar feelings even before their skin has started to pigment or their rash to clear. This mood change might be a direct psychological effect or might be secondary to a UV-provoked action such as a change in endocrine function. We therefore measured the concentration of various hormones in blood and urine before and after PUVA given therapeutically to 4 patients with psoriasis.

PATIENTS AND METHODS

Four female patients aged 19, 21, 33, and 72 years, admitted to hospital for treatment of chronic plaque psoriasis, were studied. The 72-year-old patient also had psoriatic arthritis for which she took prednisone 5 mg a day; none of the others was receiving systemic medication or had used topical corticosteroids during the previous month.

PUVA treatment

Each patient received 0.6 mg/kg of 8-MOP by mouth and 2 hours later the whole body was exposed to a high intensity source of UVA (PUVA 4000 Sylvania Lifeline F.R. 90 T12/PUVA/HO fluorescent tubes emitping up to 12 mw/cm^2 of UV radiation at 320–400 nm). The duration of exposure in individual patients depended upon their response to natural sunlight and is described elsewhere (3).

Blood hormones

Blood was taken from an indwelling venous catheter before treatment at 09.00 h, and 1 hour, 5 hours and 24 hours after treatment. Immunoreactive MSH-like peptides were measured as β-lipotropic hormone (β-LPH) (2), and thyroid-stimulating hormone (TSH), growth hormone (GH), luteinizing hormone (LH), follicular-stimulating hormone (FSH), prolactin, adrenocorticotrophic hormone (ACTH), cortisol, oestradiol, testosterone, triiodothyronine (T3), thyroxine (T4) were measured by standard methods. Additional samples were taken at midnight for ACTH and cortisol estimations.

TRH response

Twenty-four hours after PUVA treatment, blood was taken for basal TSH levels and then synthetic TRH 0.2 mg in 2 ml solution was administered intravenously, further blood samples being taken for TSH estimations at 20 and 60 min.

Urine hormones

17-oxosteroids (17 OS), 11-hydroxycorticosteroids (11 OHCS) and 4-hydroxy-3-methoxy-mandelate (HMMA)

Table 1. *Blood hormones before and after PUVA therapy*

	Patient no.	Before	1 hour	5 hours	15 hours (midnight)	24 hours	Normal values
β-LPH	1	127	126	110	–	86	80–150 pmol/l
	2	106	166	150	–	137	
	3	143	239	161	–	117	
	4	130	221	162	–	131	
TSH	1	4.2	2.9	3.4	–	–	0–6 mU/l
	2	2.8	3.4	1.5	–	–	
	3	7.3	6.5	5.4	–	–	
	4	4.6	2.6	2.3	–	–	
GH	1	<1.0	<1.0	5.2	–	4.2	<8 mU/l
	2	3.8	2.4	<1.0	–	1.7	
	3	15.5	<1.0	<1.0	–	3.9	
	4	<1.0	<1.0	7.6	–	11.0	
LH	1	2.5	3.0	2.9	–	3.8	1.6–25 μ/l
	2	11.0	5.5	9.5	–	3.7	
	3	4.8	5.5	2.9	–	5.7	
	4	31.0	43.0	43.0		39.0	
FSH	1	45.0	30.0	50.0	–	50.0	1.7–15 μ/l
	2	5.1	2.8	3.0	–	2.6	
	3	1.8	2.5	2.6	–	2.3	
	4	2.7	3.7	2.4	–	3.1	
Prolactin	1	250	–	149	–	192	<700 mU/l
(mean of 3)	2	367	–	212	–	232	
	3	97	–	147	–	201	
	4	494	–	320	–	357	
ACTH	1	123	–	–	130	–	<80 ng/l
(24.00 h)	2	20	–	–	19	–	
(midnight)	3	16	–	–	26	–	
	4	<12	–	–	20	–	
(9.00 h)	1	141	140	–	–	104	10–80 ng/l
	2	14	51	–	–	23	
	3	25	39	–	–	<12	
	4	<12	13	–	–	<12	
Cortisol	1	320	–	–	120	–	190–720 nmol/l
(24.00 h)	2	70	–	–	70	–	Midnight
	3	100	–	–	40	–	
	4	100	–	–	150	–	
(9.00 h)	1	200	240	–	–	200	<220 nmol/l
	2	260	220	–	–	260	
	3	340	370	–	–	260	
	4	300	420	–	–	370	
Oestradiol	1	100	63	125	–	117	35–1 000 pmol/l
	2	263	475	463	–	433	
	3	275	263	263	–	250	
	4	250	188	163	–	95	
Testosterone	1	0.2	0.3	0.2	–	0.4	0.6–1.9 nmol/l
	2	1.6	1.7	1.6	–	2.0	
	3	0.9	1.5	1.4	–	1.5	
	4	1.5	0.8	0.4	–	0.5	
T3	1	2.6	2.2	1.5	–	1.7	1.2–3.0 nmol/l
	2	1.5	2.0	2.2	–	2.0	
	3	2.0	2.5	1.5	–	1.7	
	4	2.0	2.0	1.5	–	1.7	
T4	1	88	82	82	–	49	60–150 nmol/l
	2	95	95	90	–	95	
	3	99	122	116	–	116	
	4	102	107	82	–	102	

Table II. *Urine hormones before and after PUVA therapy*

Urine	Patient no.	Before	24 hours after first treatment	Normal values
17 OS	1	13	33	7–60 μmol/ 24 h
	2	17	33	
	3	35	34	
	4	39	33	
11 OHCS	1	160	140	145–700 nmol/ 24 h
	2	220	300	
	3	190	220	
	4	55	55	
HMMA	1	33	18	<52 μmol/ 24 h
	2	30	27	
	3	32	14	
	4	223	21	

were measured in 24-hour urines samples collected before and after treatment.

RESULTS

The results before and after treatment were within normal limits with the following exceptions:

(*a*) Patient 1 (Table I) in whom the plasma ACTH was elevated throughout. This may have been due to anxiety as she was very apprehensive.

(*b*) TSH levels were lower at 1 and 5 hours than before treatment, except for patient 2 (Table I).

(*c*) In patient 3 (Table I) the pre-treatment level of TSH was just above normal.

There were additional trends although all values were within normal limits, with the following exceptions:

(*a*) In patient 3 the serum prolactin fell by as much as 100–200 mU/l at 5 hours.

(*b*) In patient 1 there was a slight but significant increase in plasma β-LPH at 1 hour ($P<0.05$—Student's *t*-test) and it was still slightly elevated at 5 hours; there was some change in plasma ACTH in the same direction in all these patients.

DISCUSSION

It is possible that the feeling of well-being after PUVA is little more than the effect experienced by most patients with chronic disease when they are given a new treatment or a placebo. This would be particularly likely with PUVA which contrasts with messy ointments and dressings previously used for treating psoriasis.

Alternatively, UV exposure may induce mood changes by more specific neuro-endocrine mechanisms. Our findings exclude a general endocrine cause for the early elevation of mood which patients describe after PUVA, in that the hormonal changes which were observed were minimal and not out of proportion to the anxiety induced by the experimental procedures. Further possibilities are of a UV-induced change in bioamines or peptides with the brain. In respect of the bioamines the slight decrease in plasma prolactin could, if confirmed, prove significant, since prolactin secretion is controlled by an inhibitory dopaminergic mechanism. With regard to the peptides it would be interesting to know if brain β-LPH changes in response to UV. It is unlikely, however, that if any such change did occur it could account for the increase in circulating β-LPH we observed, as we have shown that blood and CSF β-LPH levels do not correlate (4, 5) and this has since been confirmed by others (1).

ACKNOWLEDGEMENTS

We are grateful to the Medical Research Council for a grant. The hormone estimations were carried out in the Department of Dermatology, the routine laboratories of the Department of Clinical Biochemistry and the SAS laboratory (Dr D. B. Cook and Dr J. H. Dewar) at the Royal Victoria Infirmary. We are grateful to all those concerned.

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