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DELAYED CONTACT ALLERGIES IN PATIENTS WITH PHOTOSENSITIVITY DERMATITIS

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Abstract. Delayed contact allergies and the clinical course of the skin disease were investigated in 14 patients with photosensitivity dermatitis/actinic reticuloid and 145 patients with polymorphous light eruption type eczema Hypersensitivity to chromium and rubber chemicals was encountered in photosensitivity dermatitis more often than in polymorphous light eruption eczema and in the comparison series of 1714 patients with other types of dermatitis. In the eczema group, delayed contact allergies to chromium, rubber chemicals, neomycin, clioquinol, balsam of Peru, fragrance and colophonium were more frequent than in the comparison group, suggesting that at least delayed contact allergy to chromium and rubber chemicals may be of significance in the development of photosensitivity in many patients who suffer eczematous reaction to sunlight.

The syndrome photosensitivity dermatitis/actinic reticuloid (PD/AR) is usually seen in middle-aged and elderly males affected by frequent contact allergies (5). The natural history, clinical appearance and action spectrum in PD/AR and in photoallergic dermatitis are alike, and only the causative photoactive substance is missing in the former disease. Of the common contact allergens, chromium (3, 18, 19), oleoresins of the *Compositae* family (6, 8), and lichens (16, 17) have been subjects of particular interest.

Eczema, polymorphous light eruption type (PLE eczema) is manifested as an idiopathic eczema caused by sunlight (10). In order to ascertain possible resemblances/differences between PD/AR and PLE eczema we have studied the natural course of the patients' dermatitis and the frequency of delayed contact allergies in patients with clinical photosensitivity manifested as eczema.

PATIENTS AND METHODS

One hundred and fifty-nine consecutive patients with an eczematous reaction to sunlight were chosen for the study. Fourteen of them had PD/AR, not limited either to the areas exposed to the sun or to the sunshine months, while the other 145 had PLE eczema appearing only during the sunny period of the year. The sex and age of the patients are shown in Table I. Other present and past dermatoses were recorded, with particular attention to the sequence of the appearances of light sensitivity and other dermatitis.

Light tests were performed in 12 patients with PD/AR and in 73 patients with PLE eczema, using either Osram Power Star HQI-TS 400W lamp or four Osram Ultravitalux lamps. Two sheets of 4 mm thick glass plate were used in tests for UVA sensitivity. In the PD/AR group, 4 patients reacted pathologically to unfiltered light only and 8 patients to both unfiltered and filtered light. In the PLE eczema group, 62 patients proved sensitive to unfiltered light and 17 also to filtered light. Eleven patients showed normal response in the light test but were clinically sensitive to sunlight.

Epicutaneous tests with a routine test series containing 25–30 substances were performed in all 14 cases of PD/AR

Table I. *Sex and age of 14 patients with photosensitivity dermatitis/actinic reticuloid (PD/AR), and of 145 patients with polymorphous light eruption type eczema (PLE eczema)*

Group/sex	Total no.	Age, years ≤14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	≥60	$\bar{x}$	Range
PD/AR	14													
Males	11					2	1			1	1	6	55	31–76
Females	3										1	2	70	58–76
PLE eczema	145													
Males	93		2	1	2	4	6	5	7	8	9	49	56	15–81
Females	52		2	3	1	6	5	1	6	5	3	20	50	17–85

Table II. *The results of epicutaneous tests in patients with PD/AR, in patients with PLE eczema and in comparison patients with other types of eczema*

Substance and concentration		A Chronic photosensitive dermatitis (11 M, 3 F) Allergic reactions		B Eczema solare (66 M, 44 F) Allergic reactions		C Comparison series (600 M, 1 114 F) Allergic reactions		*P*-value		
		n	%	*n*	%	*n*	%	A>B	A>C	B>C
Ni	2.5	3	21	12	11	180	10.4	N.S.	N.S.	N.S.
Co	1.0	3	21	18	16	147	8.5	N.S.	N.S.	0.01
Cr	0.5	9	64	22	20	108	6.2	<0.01	<0.001	<0.001
Any metal		10	71	33	30	270	15.5			
Rubber chemicals (PPDA 1%, MBT 2%, TMTM 1%[a]		6	43	11	10	85	4.9	<0.001	<0.001	<0.025
Neomycin	20	3	21	23	21	200	11.5	N.S.	N.S.	<0.01
Basitracin	20	3	21	16	15	186	10.7	N.S.	N.S.	N.S.
Clioquinol	6	1	7	8	7	32	1.8	N.S.	N.S.	<0.001
Dequalin chloride	1	1	7	3	3	19	1.1	..	..	..
Balsam of Peru	25	2	14	13	12	88	5.1	..	..	<0.01
Perfume mix	3	3	21	9	8	54	3.1	..	..	<0.01
Colophonium	20	2	14	9	8	42	2.4	..	..	<0.01
Wood tars[b]	12	1	7	4	4	18	1.0	..	..	..
Wool alcohols	30	1	7	1	1	19	1.1	..	..	..
Formaldehyde	1	0		4	4	24	1.4	..	..	..
Turpentine peroxides	0.3	0		4	4	17	1.0	..	..	..
Parabens	15	1	7	0	0	4	0.2	..	..	..
Negative to all		3	21	33	30	1 125	64.7	N.S.	<0.001	<0.001

[a] PPDA: Paraphenylenediamine; MBT: mercaptobenzothiazole; TMTM: tetramethylthiurammonosulphide.
[b] Pine, beech, juniper, birch, 3% each.

and in 110 cases of PLE eczema. The chamber test (Finn Chamber®, Epitest, Helsinki) with 20–24 h occlusion was used. The results were usually recorded 24, 48, and 72–96 h after the application of the tests.

The epicutaneous test were performed on symptom-free back skin. In 13 patients in whom there was some doubt about the allergic nature of the test reactions, retesting was performed later on, with the same result. In 12 additional patients the positive test result was verified by titration series.

The comparison series consisted of 1714 patients with various forms of dermatitis (photosensitivity excluded) sent in 1976–77 for epicutaneous tests at the allergy laboratory of the Department of Dermatology, University of Oulu. The test substances were the same as in the photosensitive patients.

RESULTS

Only 3 out of 14 patients with PD/AR were shown to be free from delayed contact allergies. The corresponding figure among the PLE eczema patients was 33 out of 110 (30%), and 1 104 of 1 714 (64.4%) in the comparison patients (Table II). Chromium and rubber chemicals were the most common allergens in the PD/AR patients, distinguishing them significantly from both the PLE eczema group and the comparison series. Furthermore, the allergen pattern in the PLE eczema group differed from that found in the comparison series; chromium, rubber chemicals, neomycin, clioquinol, balsam of Peru, perfume mix and colophonium were the substances which caused contact hypersensitivity more often than expected.

One patient with PD/AR showed a positive reaction to the leaves and stem of *Chrysanthemum leucanthemum*, and the reactions were greatly intensified by UVA irradiation. This patient, a 51-year-old woman, was also allergic to nickel, cobalt, chromium, colophonium, neomycin and basitracin.

Allergic contact dermatitis was diagnosed in 49 photosensitive patients, chronic constitutional eczema (atopic dermatitis) in one, and stasis dermatitis in 3 patients. Contact dermatitis appeared prior to the clinical photosensitivity in 36 patients, concomitantly in 5 patients and after it in 2 patients (Table III). Six patients were not able to say which one was the first to appear.

Table III. *The sequence of light hypersensitivity and other types of eczema in 14 patients with PD/AR and 145 patients with PLE eczema*

Group	Other eczema first		Light sensitivity first		Light sensitivity and other eczema at same time	Light sensitivity only
	n	y., $\bar{x}$ (range)	*n*	y., $\bar{x}$ (range)	*n*	*n*
PD/AR	4	13 (3–21)	0		1	9
PLE eczema	36	10 (1–30)	2	21 (13–28)	5	102

DISCUSSION

The dilemma in the diagnosis of dermatitis caused by sunlight is obviously a consequence of the fact that the borderlines between the possible disease entities are not clear. Photosensitivity manifest as an eczema has been considered to be merely a form of polymorphous light eruption (10). Ramsay & Kobza-Black (14) introduced the term "Photosensitive eczema" for a group of male patients, usually with persistent eczema, in whom light sensitivity had developed subsequently. Later, Ramsay (13) preferred to separate photosensitive eczema from PD/AR, which was first described by Ive and his co-workers in 1969 (9). PD/AR is seen in middle-aged and elderly men in whom the dermatitis may take the form either of lichenified dermatitis of the face, the neck, and the dorsa of the hands, or of lymphoma-like lesions affecting the head and hands and frequently also covering parts of the body, or there may be severe episodes of erythrodermia (4). This syndrome was seen in 136 out of 775 photosensitive patients referred to the Department of Dermatology at Ninewells Hospital, Dundee (5).

In the present study 14 out of 159 patients with an eczematous reaction to sunlight met the criteria for PD/AR, while the other 145 patients had PLE eczema. Special subgroups (e.g. photosensitive eczema) could have been formed, but the cirteria for separate groups would have been confusing. This is why the PLE eczema group was treated as a single group. In this group, there were 52 females and 93 males, mean age 54 years (range 17–81). In the PD/AR group, there were 3 females and 11 males, all of about the same age as the PLE eczema patients.

The significance of delayed contact allergies in the development of hypersensitivity to light has been questioned (5). Photoactive substances such as chlorpromazine, bergamot, hexachlorophane, trichlorocarbanilide, and halogenated salicylanilides may be responsible for some cases (4, 9, 12). Epoxy resin also seems to belong to the group of substances capable of causing persistent photosensitivity (1).

The oleoresins of *Compositae* plants (5, 6, 7, 8) and the lichens (16, 17) have been found to be frequent contact allergens in PD/AR. Longwave UV-light frequently exacerbates the reactions.

Feuerman (2) and Tronnier (18) reported that patients with delayed contact allergy to chromium are more sensitive to light than are other dermatological patients without chromium allergy. Wahlberg & Wennersten (19) found that UVB irradiation exacerbated the reactivity to chromium in 12 out of 25 chromium-allergic patients. The difference was seen more distinctly in clinically photosensitive patients. However, the reason for this intensification remained obscure. In the present study, delayed contact hypersensitivity to chromium was encountered in patients with PD/AR significantly more often than in PLE eczema patients and in patients with other eczemas. The difference between the last two groups mentioned was also significant. Allergy to rubber chemicals was also found in PD/AR more often than in the PLE eczema group, but otherwise the delayed contact allergies in these groups resembled each other closely. On the other hand, in comparison series, common contact hypersensitivities were fewer than in the photosensitive groups, with the exception of nickel allergy, which was encountered with about the same frequency in all three patient groups. This result suggests that at least chromium and rubber chemicals may be involved in the induction of photosensitivity in eczema patients. This may be of importance for further investigations into the relationships between delayed contact hypersensitivities and photosensitivity. In many patients with PLE eczema the disease slowly worsens and eventually

progresses into PD/AR, and in sporadic cases also into real malignant lymphoma of the skin (11, 15).

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