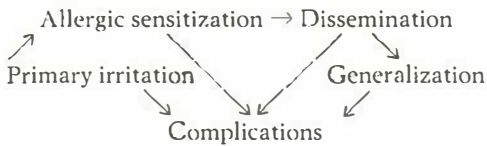


## HOUSEWIVES' ECZEMA AND THE ROLE OF CHROMATES

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### Introduction

The term "housewives' eczema" is often connected only with clinical symptoms of primary irritation by detergents. This seems incorrect since these symptoms represent only the first stage of the disease which is, in fact, a complex of events:



The first stage of this complex may persist for a long time. The dry, rough skin, often marked by multiple fissures and sometimes accompanied by a more or less mild erythema, is a direct effect of the detergents on the skin. This injurious effect consists of damage, particularly to the epidermis, mostly of its superficial layers.

In some cases development of the disease stops in this stage. This is why the picture is sometimes confused—as a kind of "pars pro toto"—with the broader term of "housewives' eczema" being used. In most cases, however, the full complex of symptoms develops, the following stage being the classical picture of contact dermatitis—a clinical expression of allergic sensitization. The connection of this stage with primary irritation and with the whole complex of housewives' eczema may not always be clear. Sometimes the contact dermatitis may be considered to be an independent process, particularly in those cases in which the clinical symptoms of "eczema e detergentibus", with rough, dry skin, have persisted

for years, with remissions and relapses, but with no other symptoms. In these cases the further development of the disease into the stage of allergic sensitization may be thought of as being unrelated to the housewives' eczema, and other causes of the allergic contact dermatitis may be sought for. However, the more or less clear limitation of the dermatitis to the hands and forearms may suggest the true origin of the disease.

It is much more difficult to discover this connection in cases where the development of disease has resulted in dissemination of symptoms to areas of skin not usually supposed to be in direct contact with detergents. The clinical picture of the disease may also be confused by signs of secondary mycotic or bacterial infection, which may simulate an autonomous disease and make proper diagnosis difficult. A generalization of the dermatitis may be seen in some cases, and if the patient applies to a physician at this stage it may be extremely difficult to see the relationship of the disease to the occupation as a housewife.

The stages of the disease do not necessarily develop in this order. For example, generalization of the skin rash may occur very early in the stage of allergic sensitization, without the mediatory stage of any partial "dissemination". Besides the signs of secondary infection, which may appear in all stages of the disease, other complications may also be present, one of the most common of which is additional sensitization to locally applied drugs—medicamentous contact dermatitis—. The latter may "cover"

Table 1. Age distribution

Age (in years)	Number of Patients
10-20	1
20-30	9
30-40	15
40-50	19
50-60	4
60-70	2
Total 50	

Table 2. Age at the onset

Age (in years)	Number of patients
10-20	3
20-30	18
30-40	20
40-50	8
50-60	1
Total 50	

the primary contact dermatitis of the housewives' eczema and make the disease particularly resistant to treatment.

#### Material and Methods

The aim of the present paper is to contribute to the understanding of the problem of housewives' eczema: We were particularly concerned with the stage of contact dermatitis. It is our purpose to show that it presents an integral part of housewives' eczema. Furthermore attention is focused on the agent responsible for its appearance.

In the first part of our study 50 cases of housewives' eczema were investigated in the stage of contact dermatitis. This enabled us to obtain a good knowledge of the disease. Against this background an attempt was made to re-evaluate diagnosis in 150 housewives with acute inflammatory skin disease of the hands, or with disseminated dermatitis which had begun on the hands. In these cases other diagnoses had previously been made (e.g. eczema, dermatitis, or dermatomycosis), but we suspected that at least some of them were really nontypical cases of housewives' eczema, or cases of

this disease which were disguised by dissemination or by secondary infection.

Group I. This included 50 married housewives, mothers of one or more children, with a history and clinical symptoms of housewives' eczema in the stage of contact dermatitis. Of these, 34 patients, or more than two thirds, were between 30 and 50 years old when they first appeared at our clinic (Table 1). They were, however, younger at the onset of the disease: 38 patients, or more than 75%, had been from 20 to 40 years old (Table 2). It was considered that these age limits were typical for the onset of the disease. The second group of patients, in which the re-evaluation was to be made, was selected in this age group.

The disease started in all but 4 patients after marriage, and in most of them several months after the first delivery. In the other 4 patients (now also married and the mothers of children) the disease began before marriage, but it was found that they had then already been doing all usual housework, including that in the kitchen and laundry.

In almost all patients the first sign of disease was dryness and roughness of the skin of the hands. In about 30% the disease began on the skin of the fingers, under marriage or adorning rings. This figure is similar to that obtained recently by Blohm and Lodin (1), but not as high as that given in other reports (2). Fissures were sometimes apparent and in some cases there were at this stage already visible signs of inflammation, apparently as result of primary irritation. In some cases the disease persisted in this state for a long time, sometimes even years, before the more or less sudden appearance of signs of acute contact dermatitis. In most cases, these signs first appeared on the dorsa of the hands and fingers and soon afterwards also on the flexor sites of the distal parts of the forearms. This typical picture, consisting in most cases of more or less strictly defined dermatitis, continued to be seen in about 60% of the cases throughout the time they were observed (2-8 years). In this time there were periods of remissions and re-

Tbale 3. Results of patch tests in the first group of patients

Positive:	
Potassium Dichromate	47
Of this number:	
Potassium dichromate only	38
Potassium dichromate and detergents	3
Potassium dichromate and nickel sulfate	3
Potassium dichromate, detergents and nickel sulfate	1
Potassium dichromate and turpentine	2
Nickel sulfate and turpentine	I
Balsam of Peru	I
All tests negative	I
	Total 50

lapses, but only in a few did the signs disappear completely. The majority of the patients continued to do their housework as before, with or without any prophylactic measures (gloves or protective ointments).

In the remaining 40 % of the cases a dissemination of the disease appeared, first mostly on the forearms, including the extensor parts as well as the flexor, and then on the upper arms, face and neck, and other regions. In some cases a generalized dermatitis of the skin of the entire body appeared.

The following four stages may be distinguished in the development of the disease: Onset of the disease (I): dry, rough skin of the hands, followed by (II) acute dermatitis of the back of the hands and the flexor sites of the forearms; thereafter (III) dissemination of the dermatitis on regions of the skin not directly exposed to detergents, particularly of the face and neck and of the flexures of the extremities; lastly—if at all—(IV) generalization of the dermatitis.

After the signs of acute dermatitis had subsided, patch tests were performed in all patients of this group and the following results obtained (Table 3): Patch tests with potassium dichromate were positive in 38 of 50 cases, most of them being strongly positive. In 9 other cases positive patch tests were obtained with potassium dichromate, and with detergents in 3 cases, with potassium dichromate and nickel sulfate in 3 cases, with all three substances in 1 case and with potassium dichromate and turpen-

tine in 2 cases. Thus the patch test with potassium dichromate was positive in 47 cases and negative in only 3 cases. Of the 3 remaining cases, positive results were obtained with patch tests of nickel sulfate in 1 case, and with balsam of Peru in another case. The last case gave negative results with all performed patch tests.

In most cases the reaction to potassium dichromate persisted for a fortnight or longer, and in some cases there remained for months a plaque of slight lichenification at the site of the test.

Group II. In view of the patch test results in the cases of typical housewives' eczema an attempt was made—as previously stated—to re-evaluate the diagnosis in a number of other cases with acute eczematous inflammation of the skin of the hands or disseminate dermatitis which had begun on the hands. We believed that in at least part of these cases the disease was a true housewives' eczema, whereas other, more general diagnosis had been made, e.g. "dermatitis", "eczema", or a diagnosis related to signs of secondary infection, e.g. pyoderma or dermatomycosis.

To this end 150 patients were chosen in accordance with the typical "model" of housewives' eczema obtained from the analysis of the previous 50 cases of this disease. Of these 150 patients, 46 were known as cases of "eczema" or "dermatitis" of the hands; 22, as "eczema e detergentibus"; 31, as "disseminated dermatitis" which had begun on the hand skin; 11, as fungus infection of the hands; and 40, as

Table 4. Results of patch tests in the second group of patients

Diagnosis	No. of cases	Positive patch tests					All tests Negative
		P. Dichr.	P. Dichr. & Nick. Sulf.	P. Dichr. & Deterg.	Nick. Sulf.	Deterg.	
Eczema (Dermatitis)	46	21	2	2	1	—	20
Eczema e Detergentibus	22	1	—	1	—	1	19
Dermatitis Disseminata	31	7	1	1	—	—	22
Dermatomycosis	51	15	—	—	—	—	36
Total	150	44	3	4	1	1	97

fungus infection of the hands and feet (Table 4).

In 97 of these cases all patch tests were negative. However, in 53 cases, i.e. more than a 1/3 of the total, positive patch tests were found, mostly to potassium dichromate, and in some to nickel sulfate and detergents. The largest number of positive patch tests was found in the group of dermatitis and eczema (26 of 46 cases). Patch tests were also positive in 15 of the 55 cases of dermatomycosis, and in 9 of the 31 cases of disseminated dermatitis, but in only 3 of the 22 cases of "eczema e detergentibus".

#### Discussion

In 1939 Rabeau and Ukrainczyk (6) discovered that traces of chromates, which are present in eau de Javelle, the most commonly used detergent in France, in the form of  $K_2Cr_2O_7$ , may cause hand eczema. In 1955 Kroepfli and Schuppli (3) found traces of chromates in other detergents as well. Their findings were confirmed by other authors. Thus Nater (5), in 1963, found especially large quantities of chromates in bleaching agents. It is now generally assumed that the small traces of chromates contained in detergents are able to cause allergic dermatitis. However, the percentage of patch tests positive to potassium dichromate noted by other investigators in cases of housewives' eczema is in general considerably lower than that found in our cases. Skog (7) performed patch tests in 90 cases of housewives' eczema, of which 24 were positive to nickel sulfate, 16 to cosmetic hand lotions, 12 to turpentine, and 10 to formalin; potassium dichromate came

sixth with 9 positive reactions. In Switzerland, turpentine was found to take first place (8). V. Zezschwitz (9) examined 38 cases with housewives' eczema and found only 8 patch tests positive to potassium dichromate. On the other hand, Krüger and Dorn (4) found positive patch tests to potassium dichromate and/or nickel sulfate in as many as 75% of cases allergic to detergents. In our own investigations, 47 of 50 patients with housewives' eczema were sensitive to potassium dichromate, other factors playing a much lesser role.

The differences between these findings are considerable. It is possible that they depend on the kind of detergents and bleaching agents used in various countries and on their chromate content. In our country, the contact dermatitis seen in the course of housewives' eczema is, in most cases, very likely caused by allergic sensitization to chromates. This conclusion makes possible the discovery of housewives' eczema in cases of contact dermatitis in which the patch tests with potassium dichromate are found positive, without any other reason for a sensitivity to chromates, provided that in all other respects they fit this diagnosis.

In the 97 of the 150 cases of Group II in which all the patch tests were negative, there was no cause to alter the previous diagnosis.

Only 3 of the 22 cases of "eczema e detergentibus" proved to be sensitive to chromates; it should be noted, however, that the latter diagnosis is usually made in cases which typically show clinical signs of the effect of detergents on the stratum corneum of the epidermis: dry, rough skin,

etc., that is, in cases only with the clinical picture of the first stage of housewives' eczema. This clarifies why the patch tests were negative in these cases in which no allergic sensitization had yet developed.

It may be assumed that in the 15 cases of dermatomycosis in which there were positive patch tests with potassium dichromate, or at least in part of them, the mycosis was present only as a secondary infection of what was actually contact dermatitis to chromates. Since no other reason for sensitivity to chromates was revealed, these cases in fact presented housewives' eczema complicated by fungus infection.

Most significant, however, were the results of patch tests in the cases of "hand eczema" or "disseminated dermatitis" which began on the hands. The high number of positive patch tests with potassium dichromate obtained in this group was not incidental in spite of the fact that none of the widely-known causes of this test (sensitivity to cement, leather, etc.) could be elicited. Here it may be assumed that the greater part of the cases with positive patch tests were true cases of housewives' eczema with a typical clinical picture, compatible anamnesis and other details. However, there is not always readiness to make this diagnosis: there is rather a tendency to make a more general diagnosis, e.g. "eczema" or "dermatitis", if there is a lack of objective evidence of the origin of the disease. It is our conclusion, based on the results of the analysis of the cases in Group No. I, that a patch test positive to potassium dichromate may be considered as such objective evidence, provided all other details, e.g. the clinical picture, the anamnesis, etc. are compatible with the diagnosis of housewives' eczema, and provided that no other cause can be found for the sensitivity to chromates. If such other cause may be found, patch tests positive to potassium dichromate prove only a sensitivity to chromates but give no evidence for the existence of a housewives' eczema.

We feel that this conclusion is valid at least under prevailing local conditions, i.e. for as long as the same detergents and bleaching agents, with the same content of

chromates now widely-used, continue to be applied.

#### SUMMARY

50 cases of typical housewives' eczema were investigated in the stage of contact dermatitis. In 47 of these patch tests with potassium dichromate were found positive—in 38 cases as the only positive test, and in 9 together with positive patch tests with nickel sulfate and/or detergents, or turpentine. The conclusion is drawn that traces of chromates, which have been found by various investigators in detergents and bleaching agents, are the most frequent cause of contact dermatitis in the course of housewives' eczema in Israel.

Re-evaluation of the diagnosis was attempted in 150 housewives with acute inflammatory skin disease confined to the hands only, or with disseminated dermatitis which had begun on the hands. It was believed that some of these were really cases of housewives' eczema in which previously either the diagnosis of the presenting complication, e.g. dermatomycosis, or the diagnosis of "eczema" or "dermatitis" was made. It was found that in about one third of these cases patch tests with potassium dichromate were positive.

It is suggested on the basis of the results in the investigation of 50 cases of housewives' eczema, that the positive patch test with potassium dichromate is, under existing local conditions, of value in diagnosing housewives' eczema if all other details are compatible with this diagnosis, and if there is no other apparent cause for the sensitization to chromates, such as cement dermatitis, shoe dermatitis, etc.

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