Evaluation of the Patch Test Results With Standard Antigens in Various Types of Eczema

ÇEŞITLI TIP EKZEMALARDA STANDART ANTIJENLERLE POZITIF PATCH TEST SONUÇLARıNıN DEĞERLENDIRILMESI

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SUMMARY

A survey of contact sensitivity to standard patch test allergens was done in 318 eczema patients of whom 215 were female and 103 were male, between 1992 and 1995. The relation between the allergens and the localization of the lesions and the professions of the 112 patients with a positive patch test was investigated on an IBM personal computure. The mean age was 35.85 with a range of 5 to 70. The most frequently found allergen to cause contact dermatitis was nickel sulfate. This was consistent with the literature. The most frequently affected area was the face and the most frequently occupational group was the office worker. These findings showed partially relation with several reports.

Key Words: Patch test, Allergen, Contact sensitivity

T Klin J Dermatol 1997, 7:96-99

ÖZET

Standart patch test allerjenlerine karşı kontakt sensitivite araştırması 1992-1995 yılları arasında 215 kadın, 103 erkek toplam 318 ekzema hastası üzerinde yapıldı. Pozitif patch test gösteren 112 hastada lezyonların lokalizasyonu veya meslek ve hobileri ile allerjenler arasındaki ilişki bilgisayar yardımı ile incelendi. Hastaların yaşları 5-70 arasında değişmekte olup yaş ortalaması 35.85 idi. Kontakt dermatite en çok neden olan allerjen nikel sülfattı. Bu sonuç literatür bilgileri ile uygunluk gösterdi. En sık görülen tutulum bölgesi yüz ve en sık görülen meslek grubu memurlardı. Bu bulgular ise literatür bilgileri ile kısmen uygunluk göstermekte idi.

Anahtar Kelimeler: Patch test, Allerjen, Kontakt sensitivite

T Klin Dermatoloji 1997, 7:96-99

Contact sensitization with several types of allergens may show primary allergic contact dermatitis (ACD) or secondary other eczematous skin diseases. Several topical therapeutic agents, occupational substances, cosmetics, metals are the causative factors in this condition. Generally these allergens are often unknown or uncertain. Therefore, patch test has become a standard method of investigating patients with suspected allergic contact dermatitis.

Many reports have been published to document the epidemiology of cutaneous hypersensitivity to a variety of chemicals between 1973-1982 (1-3).

Since 1982, patch test results were computerized and various reliable data were collected. It is showed that allergic contact sensitization in a population is influenced by individual factors as well as epidemiological factors (4-6).

Geliş Tarihi: 12.12.1996

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The aim of this study was also to evaluate using personal computer the influence of individual factors in eczema patients, such as sex, age, localization, occupation by clinical patch test results.

PATIENTS AND METHODS

In the period 1992-1995, 318 patients with various types of eczema suspected of having contact allergy were patch tested with most frequent contact allergens consisting 22 substances in a standard patch test series (Table 1).

The patient's name, sex, profession, address, date of birth, date of patch test, localization of eczema was recorded in IBM 386 personal computer using the program Works containing database tool. Different subsets of this record were defined and sensitization rates in these subsets were calculated.

According to the localization, patients were divided into 5 groups: Hands, face and eyes, trunk, limbs and feet. On the other hand 6 occupation groups were identified including housewives, hospital workers, teachers, officers, students and children and the others.

Patch tests were performed using Finn chambers on sconpor. All test substances were applied on the back

Table 1. Details of 22 allergens in standard patch test series

1. Potassium dichromate 0.5% pet	12.Wool alcohol 30.0% pet
2. Neomycin sulphate 20.0% pet	13.Mercapto mix 2.0% pet
3. Thiuram mix 1.0% pet	14.Epoxy resin 1.0% pet
4. Paraphenylenediamine 1.0% pet	15.Paraben mix 12.0% pet
5. Cobalt chloride 1.0% pet	16.BB-resin 1.0% pet
6. Benzocaine 5.0% pet	17.Fragrance mix 8.0% pet
7. Formaldehyde 1.0% aq	18.Ethylenediamine 1.0% pet
8. Colophony 20.0% pet	19.Quaternium 1.0% pet
9. Qinoline mix 6.0% pet	20.Nickel sulfate 5.0% pet
10.Balsam of peru 25.0% pet	21.Me- izothiazolinon 0.67% pet
11.PPD-Black rubber 0.6% pet	22.Mercaptobenzothiazole 2.0% pet

Table 2. Sex and age distribution of 318 patients patch tested with the standard series

Age (years)	male	female	total
0-9	2	2	4
10-19	6	25	31
20-29	23	92	115
30-39	36	53	89
40-49	22	31	53
50-59	9	9	18
60-69	4	2	6
70-79	1	1	2
Total	103 (32.3%)	215 (67.6%)	318

and let in place for 48h. Test stripes were removed and read at 48 and after 96h. The applications and readings were done by the same person. Patches were read at least 20 minutes after their removal to allow nonspecific mechanical irritation to subside.

Reactions were graded on a (-) to 3+ scale according to the recommendations of the North American Contact Dermatitis Groups (-):no reaction;(+):weak allergic reaction (only erythema);(++):moderate reaction (erythema and edema);(+++):strong reaction (erythema, edema and vésicule or bulla).

RESULTS

In this study, 67.6% of the total cases were female and 32.3% were male. The age ranged from 5-70, with a mean age of 35.85 years (Table 2). The majority of patients were among 20-49 years old with a peak at 20-29 years.

The number of patients with at least one positive reaction were 112 (35.2%) (Table 3). Thhirty two were male

Table 3. The number of patients with positive allergic reactions

Sex	Total	Positive patch test	%
Male	103	32	28.5
Female	215	80	71.4
Total	318	112	35.2

Table 4. Positive patch test in the different age groups

Age (years)	Male	Female	Total	%
0-9	2	1	3	2.6
10-19	1	7	8	7.1
20-29	6	38	44	39.2
30-39	14	19	33	29.4
40-49	5	13	18	16
50-59	3	2	5	4.4
60-69	1	-	1	0.8
70-79		-	-	
Total	32	80	112	

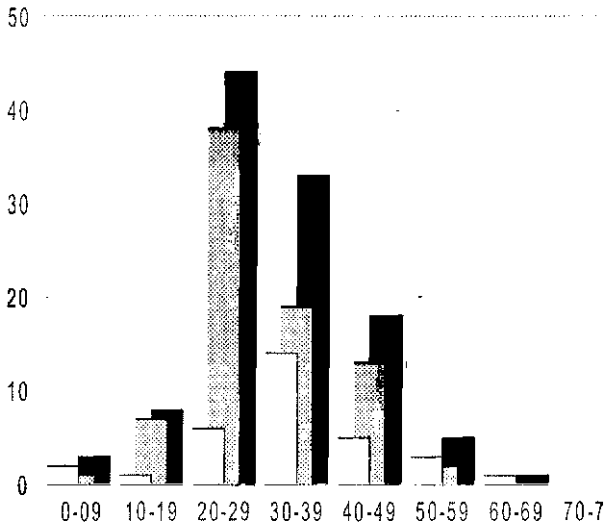

Fig. 1. Distribution of the age in the patients with positive allergic reaction

(28.5%); 80 were female (71.4%). The highest number of positive reaction was in the 20-29 year old group 44 patients (39.2%) (Table 4, Fig.1).

Twenty-one of the 22 allergens caused positive reactions.

The 3 allergens that produced the largest number of positive reactions were nickel sulfate, cobalt chloride and potassium dichromate with a total of 76 reactions (Table 5, Fig.2). Nickel sulfate was the most frequent (43 positive reactions), followed by cobalt chloride (17 positive reactions) and potassium dichromate (16 positive reactions).

Table 5. Positive allergens

Allergens	Male	Female	Totai	%
Potassium Dichromate	12	4	16	5
Neomycin Sulphate	3	5	8	2.5
Thirum mix	4	3	7	2.2
Praphenylenediamine	2	6	8	2.5
Cobalt chloride	8	9	17	5.3
Benzocaine	-	3	3	0.9
Formaldehyde	2	2	4	1.2
Colophony	1	2	3	0.9
Qinoline mix	-	2	2	0.6
Balsam of peru	3	1	4	1.2
ppd black rubber	3	-	3	0.9
Wool alchol	5	2	7	2.2
Mercapto mix	1	-	1	0.3
Epoxy resin	-	2	2	0.6
Paraben mix	-	-	-	-
BBF-Resin	5	2	7	2.2
Fragrance mix	2	4	6	1.8
Etilendiamine	-	1	1	0.3
Qaternium 15	1	5	6	1.8
Nickel sulfate	7	36	43	13.5
Me-isothiazolinon	1	1	2	0.6
Merkaptobenzothiazol	1	-	1	0.3
Total	60	89	149	

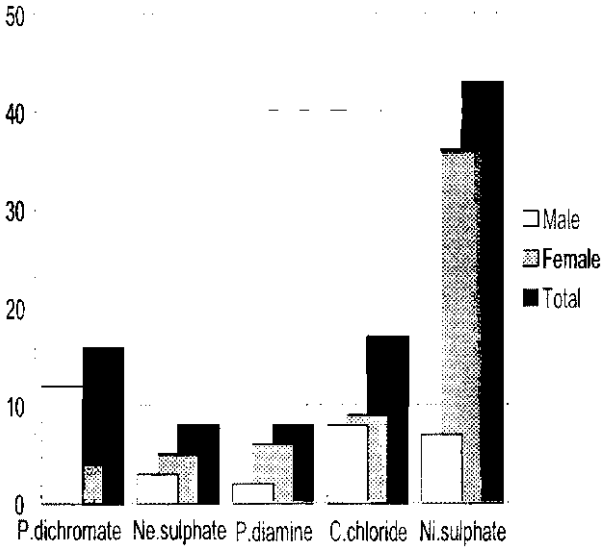

Fig. 2. The allergens which produced the largest number of positive reactions
P.dichromate: Potassium dichromate
Ne. sulphate: Neomycin sulphate
P. diamine: Paraphenylenediamine
C. chloride: Cobalt chloride
Ni. sulphate: Nickel sulphate

According to the occupations, office worker group showed the highest number of positive reaction among all groups, followed by Housewives group and the others group including various occupations (Fig. 3).

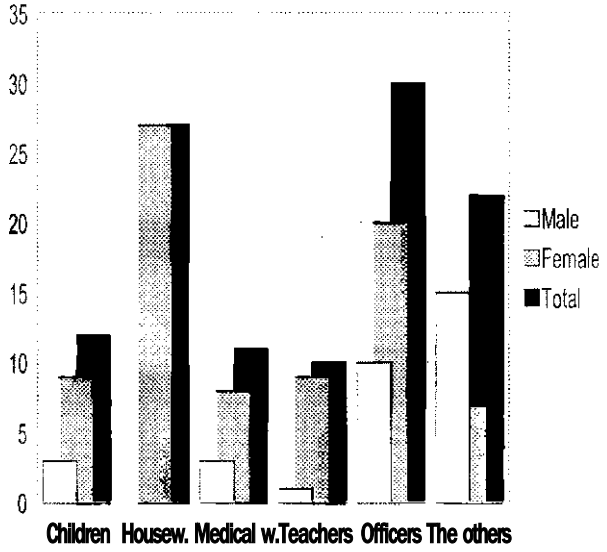

Fig. 3. The occupation groups with positive patch test
Housew. : Housewives
Medical w. : Medical workers

Teachers group had the highest incidence of positive reactions (55.5%) in each occupation group. The office worker (46.1%) and medical worker (42.3%) group also showed a high positive reaction (Table 6).

Although the most common localization of eczema was on the hands followed by the face in each group, the highest percentage of positive reaction was established in face. Dermatitis on the trunk, limbs, feet, and genital region showed the lower frequency of positivity to allergens in standard patch test series (Table 7).

Table 6. Distribution of the patients positive patch test reactions according to their occupations

Occupation	Male	Female	Total	%
Children	15/3	29/9	44/ 12	27.3
Housewives	-	101 /27	101 /27	26.7
Medical workers	15/3	11 *18*	26/11	42.3
Teachers	5/1	13/9	18 /10	55.5
Officers	38/10	27/20	65/30	46.1
The others	30/15	34/7	64/22	34.3
Total	103/32	215/80	318/ 112	35.2

Table 7. Localization of lesions in patient with positive patch test results

Localization	Male	Female	Total	%
Face	8/3	59/25	67/28	41.7
Trunk	15/3	43/20	58/23	39.6
Limbs	33/9	33/11	66/20	30.3
Hands	84/26	147/50	231 / 76	32.9
Feet	8/7	16/2	24/9	37.5
Genital region	3/1	-	3/1	33.3

DISCUSSION

In our study, contact sensitization to various types of allergens was found in 112 (35.2%) of the 318 patients. The frequency of positive reactions was lower than that of some other centers (6,7,8,9). Our results support the prior reports of Vien et al and Hammershoy studies (10,11). There is significant difference in the number of the positive patch test reactions between males (28.5%) and females (71.4%) and the most common positive patch test reactions were found in 20-39 age group. This was also observed in other European centers (12,13). Females were markedly more likely to have a positive patch test reaction than males with the most frequency among 20-39 ages. This difference between males and females were due to contact with fashion jewelry and housework in the women. Similar results have been demonstrated in previous studies in Europe (10) and North America (3).

In the patients with positive patch test group, nickel sulfate, followed by cobalt chloride and potassium dichromate showed the highest frequency of positive reaction. Nickel sensitivities were found in 11% of 1200 patients in USA. Other studies were also reported with lower results (1,14,15). In our study the incidence was 13.5% with the highest frequency. Women were five times more sensitive than men. The majority of nickel sensitivity was found in the 20-39 age group. Christopher and Storrs in 1989 and Zhang in 1991 and Enders showed similar results with our findings (4,5,9,16). The women became sensitive to nickel usually without occupational relevance but associated with wearing jewelry.

The second highest sensitization was presented with cobalt chloride; the third was potassium dichromate in the patients with positive patch test results. Nickel sensitivity was found to be accompanied by cobalt sensitivity. We concluded that there might have been a cross-reaction between nickel sulfate and cobalt chloride(17). Potassium dichromate sensitivity gave male and female ratio of (12/4). Although Zhang et al showed different results than our findings, ratio was 8/14 (9); there were similar results in some other studies (6,16). The distribution of chromate is widely and more abundantly than all other metals. The general population exposes to chromate in leather, matches, glues, paints, detergents, bleaches and cement. In our study, dichromate sensitivity didn't show significant relation with these exposing factors and professions. These findings were not similar than that of the other centers. Potassium dichromate sensitization was the most common one seen in individuals working in office, factories, buildings (17).

In our study office workers was found as the most common occupation group, the second was housewives and the third was the others. Our result was different from Zhang's report. Factory worker that was included in the others group was the most common occupation in this center (9). The localization of eczema showing the highest frequency between the localization groups was the face. Trunk and feet were evaluated in second and third group. In several studies, hand eczema showed the highest frequency on the contrary of our findings (5,6). Although limbs localization was reported to be the most common localization giving positive allergic reaction both by Christopher and Tuderman (5,6), localization of the face were only seen in Tuderman's study (6).

Our data clearly demonstrate significance sex, age, localization and occupation dependent differences in sensitization rates to allergens in standard patch test series.

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