

# Patch testing: need for local guidelines

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## Abstract

Patch testing is a simple procedure performed in order to identify allergens in allergic contact dermatitis. Currently at Teaching Hospital, Ragama we use test material battery of European Environmental and Contact Dermatitis Research Group (EEC-DRG) standard and we also maintain a database.

A retrospective analysis of patch test data of past two years (01.01.2007-31.12.2008) was done. The commonest type of dermatitis referred for patch testing was foot dermatitis (28.1%), followed by hand dermatitis (17.4%). The commonest pre-patch testing suspected allergen was rubber products (31.4%) followed by cement (14%) and hair dye (8.9%).

There was a significant number of negative tests (45.5% of total). Out of positive results the commonest allergen was potassium dichromate (27.3%) followed by mercaptobenzothiazole (24.2%). 56.8% of positive results correlated positively with suspected pre-patch test allergen.

Certain allergen such as quaternium 15 has never given positive results in our group.

Positivity rates are lower, and the pattern of positive allergens differs compared to European results.

These findings prompt the need of multicentre analysis of patch test data in order to formulate local guidelines.

## Introduction

Allergic contact dermatitis (ACD) is a common problem in dermatology and together with irritant contact dermatitis, comprises 6-10% of all dermatology clinic visits. ACD is a delayed type hypersensitivity reaction, which develops in a predisposed individual as a consequence of environmental exposures to allergens.

Exposure patterns change over time owing to fashion trends, technological developments, regional traditions and environmental specifications or as a result of official regulations. There is variability from centre to centre and from country to country.

Identifying trends in our own country is important in formulating our own guidelines for patch testing and formulation of environmental specifications and regulations

## Methods

This is a descriptive study. A retrospective analysis of data of patch tests performed within past two years (01.01.2007-31.12.2008) at Teaching Hospital, Ragama was done. Patch tests were performed with standard European Environmental and Contact Dermatitis Research Group (EEC-DRG) battery.

## Results

178 patients have been referred for patch testing during this period, 90 patients were females and 88 were males (2 defaulters had been left out from the analysis). Age range was 13 to 74 years.

Out of them 95 (50.4%) had positive allergic reactions - 48 females and 47 males. 2 patients had angry back, 19 (10.7%) patients had irritant type reactions and 62 (34.8%) did not display any reactions.

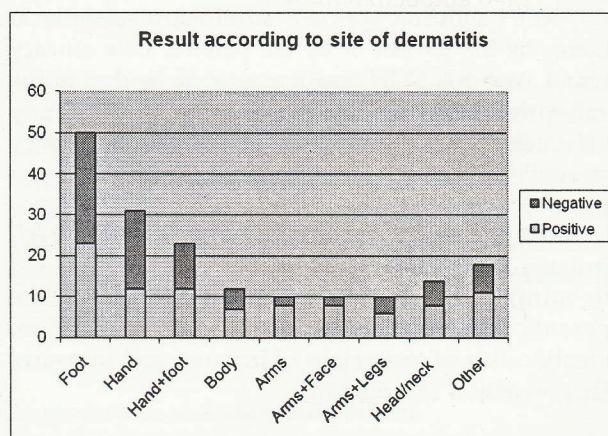


Figure 1

The site of dermatitis and the outcome of patch test were analyzed and results are shown in figure 1.

Out of 178 patients 50 (28.09%) had foot dermatitis, 31 (17.4%) had hand dermatitis, 23 (12.9%) had dermatitis of hand and foot, and 74 others had different patterns.

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Main observations according to type of dermatitis are

- 17 patients with foot dermatitis had positive reactions to allergens related to rubber (total no. of positives 23).
- 8 patients with dermatitis of head/neck or face/arm distribution had positive reactions for Paraphenylene diamine (PPD), (total no. of positives 16).

There was no consistent pattern in patients with hand dermatitis.

Out of the 95 patients with positive ACD reactions, 49 were positive for one allergen, 26 for two and 20 for more than two. 81 (45.5%) patients did not show allergic reactions to test substances.

Males had strikingly high sensitivity to chromium and cobalt. Females had high sensitivity rate

to nickel and fragrance mix. Results are shown in Table 1.

Patients were divided into four categories according to pre-patch test exposure and the correlation with results was analyzed

- 1 - patients with assumed allergen related to occupation (41)\*\*
- 2 - patients with assumed allergen unrelated to occupation (97)\*
- 3 - patients with occupational risk but without specific allergen (11)\*\*\*
- 4 - patients without assumed allergen or occupational risk (29)

Outcome is shown in Figure 2. Clinical relevance (positive correlation) was highest 41.5% when assumed allergen is related to occupation.

Table 1. Results of positive allergic reactions

	Male	Female	Total	% of total
Potassium dichromate	21	5	26	14.61
Mercaptobenzothiazole	12	11	23	12.92
Cobalt chloride	11	4	15	8.43
Mercapto mix	7	8	15	8.43
PPD	7	7	14	7.87
Nickel sulphate	1	12	13	7.30
Neomycin	5	7	12	6.74
Thiuram mix	8	3	11	6.18
Fragrance mix	1	4	5	2.81
Colophony	1	2	3	1.69
Formaldehyde	1	1	2	1.12
Balsam of Peru	1	1	2	1.12
IPPD	1	1	2	1.12
Epoxy resin	1	1	2	1.12
Phenol formaldehyde resin	0	2	2	1.12
Benzocaine	1	0	1	0.56
Clioquinol	0	1	1	0.56
Wool alcohol	1	0	1	0.56
Paraben mix	0	1	1	0.56
Cl Me- Iso thiozolin	0	1	1	0.56
Primin	1	0	1	0.56
Budesonide	1	0	1	0.56
Tixocortol pivalate	1	0	1	0.56
Quaternium-15			0	



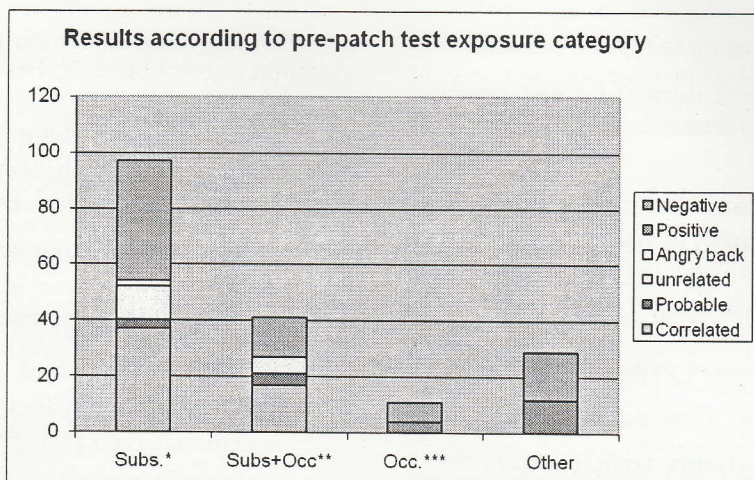


Figure 2

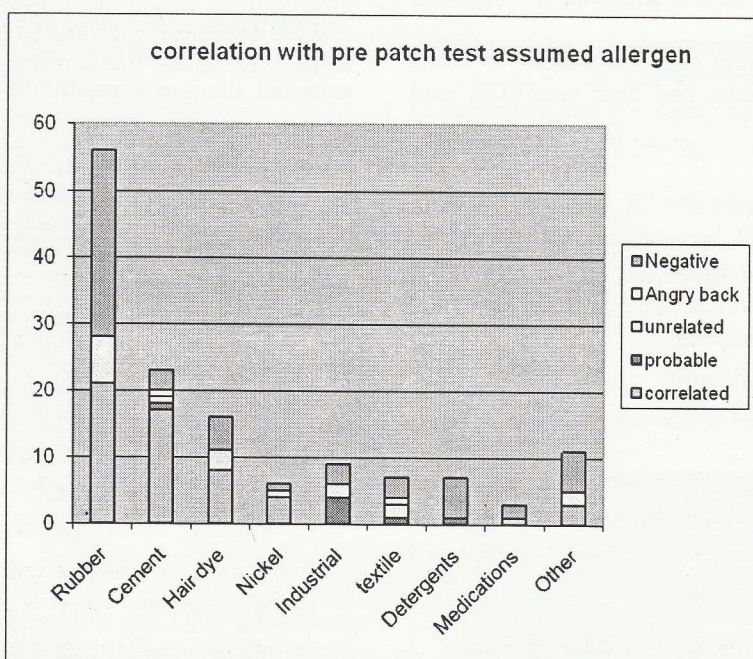


Figure 3

Correlation with pre-patch test assumed allergen and patch test outcome is shown in Figure 3. 54 (56.8% of positives) patients with allergic reactions had clinical relevance with pre-patch test assumed allergen (30.3% of the total). Out of the 95 positive patients 18 had sensitivity to substances unrelated to assume one. Establishing clinical relevance of other 23 patients was not possible as they were unable to provide adequate information.

Correlation was poor with pre-patch test assumption of textile and detergent allergy.

Irritant reactions were observed in total of 36 patients. 17 of those had positive allergic reactions as well.

Commonest irritants seen were balsam of Peru, cobalt and fragrance mix.

### Discussion

The positivity rate is slightly less than in most European studies but this may be due to unavailability of extended patch test series in our setup. Positive rate is known to be higher in females but in our study it was almost equal. Although positive rates are comparable, clinically relevant positive reactions are low (30.3%) in our study.

The most common allergens identified were: chromium, chemicals in rubber products (mercapto-benzothiazole, mercapto mix, thiuram mix), cobalt chloride, PPD and nickel sulphate.

Nickel was the commonest allergen seen in most studies (Tables 2, 3) but in our patients it was in 6th



place and the clinical relevance is also low. Nickel sensitivity was very high in females compared to males. Possible explanation is sensitization by nickel in jewellery/garments.

Table 2. Sensitivity pattern in developed countries

	Germany	GB	USA	Japan
Nickel	15.7	18.6	16.2	13.5
Chromium	3.9	21	5.8	9.2
Fragrance	11.7	10.7	10.9	5.8
Balsam of Peru	8.2	6.7	12.3	5.2
Cobalt	4.9	5.6	7.6	17.3
Neomycin	2.5	2.9	11.5	4
PPD	4.2	3	4.9	6.1
Mercapto mix	0.7	1.1	1.3	0.6
Thiuram mix	2.4	3.5	4.7	2.6

Table 3. Commonest allergens in some other countries

Pakistan	Iran	Saudi Arabia
1 Nickel	Nickel	Nickel
2 Chromium	Cobalt	Chromium
3 Formaldehyde resin	Fragrance	Cobalt
4 Cobalt / Fragrance	Chromium	Fragrance

Sensitivity to chemicals in rubber products is exceptionally high with high clinical relevance (footwear most frequently) which was not a feature in most other studies. Usually when we refer patients with foot dermatitis for patch testing there is high index of suspicion for rubber products, though the very high frequency of allergy to rubber products cannot be attributed to this alone. It will be interesting if we can compare this with results of other centres of our country. Further investigations may be needed to find out whether this could be related to the manufacturing process.

Sensitivity to cosmetics (fragrance mix, balsam of Peru) is comparatively low in our setup at present, which status could change with the current trend of higher consumer demand for cosmetic products.

Positive reaction to neomycin was high indicating sensitization by topical medications. We should adopt a more rational approach when

prescribing topical antibiotics, which would also help in combating antibiotic resistance.

Quarternium-15 has not given any positive results in our series<sup>8</sup>. other substances tested have given one positive result each in this group. Although some literature suggests that it is not necessary to continue testing for substances with less than 1% yield, we cannot make such recommendations as our study group is small with most patients coming from a small area of the country.

In our patient group there were 40 patients who failed to give enough information regarding pre-patch test assumed allergen (Figure 2, groups Occ. and Other). Although some of these had positive results at the end they were not very valuable in patient management (except in the cases of allergy to neomycin). Therefore we should encourage such patients to provide more information about their exposed substances before referring for patch testing.

If we strictly adhere to recommended indications for patch testing the number of patients who should have had patch test during our study period would be higher than 178 (number we had). This is mainly due to limited availability of resources, which may have an impact on outcome of this study. However we can raise the following questions based on our results:

- Are we adhering to proper criteria when referring patients for patch testing?
- Are there locally relevant sensitizers which are not available in ECC standard patch test series?
- Is it useful to continue with low yield substances in the series and can we replace them with others?
- Is there an urgent need for extended patch test series?

We would like to propose the following recommendations based on our observations:

- A multicentre prospective study in order to find answers to the questions posed above and to setup local guidelines, based on such a study.
- A reference centre for the country to be established with extended patch test series.

## References

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