

Relevance of positive patch test reactions in patients attending a dermatology tertiary referral centre

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Our purpose was to determine the proportion of relevant patch test reactions among all patch tested patients in the National Skin Centre (NSC), Singapore, from 1 January 1999 to 31 December 2000. A retrospective study was made of the patch test records of all patients patch tested in the study period. The proportion of relevant patch tests in this population was then determined. The allergens most likely to have present or past relevance were: nickel sulfate (79%), *p*-phenylenediamine (76%), colophonium (73%), cobalt chloride (68%) and potassium dichromate (67%). The most common allergens for each of the following relevance categories were as follows – present: *p*-phenylenediamine, thiuram mix, potassium dichromate; past: colophony, nickel sulfate, cobalt chloride; exposed: neomycin, gold sodium thiosulfate, fragrance mix and unknown: gold sodium thiosulfate, potassium dichromate, cobalt chloride. Evaluating relevance is difficult, and the results of relevance scoring vary widely between different groups. A consensus on the definition and standardization of the concept of relevance is needed.

Key words: allergic contact dermatitis; chromate; clinical relevance; cobalt; colophonium; nickel; *p*-phenylenediamine; patch testing; thiuram mix. © Blackwell Munksgaard, 2003.

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Evaluating a positive patch test reaction is the most challenging part of the patch test procedure, requiring thoroughness, skill and experience on the part of the dermatologist. The aim of this study was to determine the proportion of relevant patch test reactions among all patch tested patients in the National Skin Centre (NSC), Singapore, during a 2-year period from 1 January 1999 to 31 December 2000.

We also discuss a new relevance category of clinical tolerance, which may be used to explain some of the positive patch test reactions which had been formerly described as not relevant.

Patients and Methods

This is a retrospective study where the patch test records of all patients patch tested in the study period were examined. The proportion of relevant patch tests in this population was then determined.

All patients were patch tested to our standard series (Table 1) and additional allergens where relevant. Patch testing was performed according to the protocol recommended by the International Contact Dermatitis Research Group (1). All reactions that were scored + or greater were considered positive under our existing scoring system.

In the NSC, relevance had been classified into 4 categories:

- (1) Present: the allergen is causing the current dermatitis.
- (2) Past: the allergen had caused dermatitis in the past but is of no current relevance.
- (3) Exposed: the allergen had been encountered by the patient before, but the patient did not develop dermatitis at that time.
- (4) Unknown: no known exposure.

Only categories 1 and 2 are considered relevant, while categories 3 and 4 are considered not relevant.

Results

In the study period, 1722 patients had been patch tested. Of these, 925 had 1 or more positive reactions. Unfortunately, only 450 (49%) of these patients had their relevance recorded. These 450 patients had 733 positive patch test reactions.

Table 2 shows the allergens most commonly recorded to have present or past relevance. Table 3 shows the commonest allergens in the various categories of relevance.

Table 1. Extended standard series used in National Skin Centre, Singapore, from 1 January 1999 to 31 December 2000

Standard series	Concentration* (%)
Butylphenol-formaldehyde resin	1
Balsam of Peru (Myroxylon Pereirae resin)	25
Chlorocresol (PCMC)	1
Colophonium	20
Budesonide	0.1
Cetearyl alcohol	20
Neomycin	20
Nickel sulfate	5
Parabens	16
PPD (4-Phenylenediamine)	1
Potassium dichromate	0.5
Mercapto mix	2
Ethylenediamine dihydrochloride	1
PPD mix (black rubber mix)	0.6
Quinoline mix	6
Cobalt chloride	1
Lanolin alcohol	30
Thiuram mix	1
Flavin	0.5
Epoxy resin	1
Fragrance mix	8
Mercaptobenzothiazole (MBT)	2
Betamethasone valerate†	2
Tixocortol 21 pivalate	1
Sesquiterpene lactone mix	0.1
Gold sodium thiosulfate	0.5

*Vehicle: petrolatum, if not otherwise stated.

†Vehicle: ethanol.

Discussion

Few studies have addressed the relevance of positive patch test reactions. de Groot (1) has pointed out that there is no uniform concept of the definition of relevance, how it should be evaluated and how it should be scored.

From 1996, the NACDG used the terms 'definite', 'probable' and 'possible' for those reactions assessed to be of current relevance. Prior to this, reactions had been classified as 'present relevance' and 'past relevance'. Lachapelle (2) pro-

Table 2. Allergens most commonly recorded to have present or past relevance

Allergen (%)	Percentage of all positive reactions to allergen
Nickel sulfate (5)	79
<i>p</i> -phenylenediamine (1)	76
Colophonium (20)	73
Cobalt chloride (1)	68
Potassium dichromate (0.5)	67
Thiuram mix (1)	61
Balsam of Peru (Myroxylon Pereirae resin) (25)	57
Fragrance mix (8)	55

posed a combination: dividing relevance into 'current' and 'past', with further scoring of both subdivisions into 0 = not traced, 1 = doubtful, 2 = possible and 3 = likely. Hence, 16 combinations could therefore be reached for each individual case.

There has also been a suggestion to modify the current NSC classification of relevance (3). A fifth category has been proposed: clinical tolerance where no dermatitis occurs on exposure to an allergen, despite a previous positive patch test reaction to the same allergen. This was used to explain the cases where patients who had positive patch test reactions to certain allergens (e.g. gold, *p*-phenylenediamine) were able to continue being exposed to these allergens without developing clinical dermatitis.

Patients with positive patch tests described as 'exposed' or 'unknown' were likely to be diagnosed as having irritant contact dermatitis or endogenous eczema. Those with positive reactions to other allergens were diagnosed to have allergic contact dermatitis to these other allergens, if they were considered to be of 'present' or 'past' relevance.

Some of the positive patch tests previously classified as 'exposed' or 'unknown' may in fact fall into the new clinical tolerance category. This would probably include a significant proportion

Table 3. The commonest allergens in the various categories of relevance

Relevance	Allergen (%)	Percentage of all positives to allergen
Present	<i>p</i> -phenylenediamine (1)	58
	Thiuram mix (1)	56
	Potassium dichromate (0.5)	50
Past	Colophony (20)	55
	Nickel sulfate (5)	53
	Cobalt chloride (1)	36
Exposed	Neomycin (20)	65
	Gold sodium thiosulfate (0.5)	60
	Fragrance mix (8)	42
Unknown	Gold sodium thiosulfate (0.5)	19
	Potassium dichromate (0.5)	13
	Cobalt chloride (1)	9

of those positive patch tests to gold sodium thio-sulfate, which had been previously labelled as 'exposed' or 'unknown' due to the lack of a more suitable category. Many patients with positive patch test reactions to this allergen had been wearing and continued to wear gold items without developing dermatitis.

In one study on contact allergy to *p*-phenylenediamine (4), elicitation of contact allergy was found to be related to exposure time and concentration. If either or both of these are below the threshold required for elicitation, the allergic response may not develop. This may be the explanation for the absence of clinical dermatitis in some patients with positive patch tests to *p*-phenylenediamine.

Evaluating relevance is difficult, and the results of relevance scoring varies widely between different groups. A consensus on the definition and standardization of the concept of relevance is needed.

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