

Evaluation of the Skin and Cancer Foundation standard series in the diagnosis of allergic contact dermatitis

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The use of a standard series of 37 allergens was evaluated in a retrospective study of 817 consecutive patients seen between April 1988 and January 1993 at the Skin and Cancer Foundation, Melbourne, Australia. Of the 316 patients with clinically relevant patch test results, 134 (42%) reacted to an allergen in the standard series alone, while an additional 122 (39%) had reactions to allergens in both the standard and supplementary series. The remaining 60 (19%) patients reacted only to allergens in the supplementary series. These data suggest that the use of our standard series alone will detect about 80% of allergic contact dermatitis cases, but that many of these may be insufficiently evaluated. Use of supplementary allergen testing in a specialised clinic is recommended for patients who may have allergic contact dermatitis.

Key words: standard allergen series; patch testing; contact dermatitis. © Munksgaard, 2001.

Accepted for publication 11 July 2001

Patch testing is routinely used to make a diagnosis of allergic contact dermatitis. A limited "standard series" of allergens has been accepted as a useful test to screen such patients. However the true value of a standard series as a screening test is unknown. Some cases of allergic contact dermatitis cannot be confirmed with the use of standard series allergens alone and require more extensive testing with supplementary allergens and samples of products used by patients.

The purpose of this study was to determine the detection rate of a standard series of allergens by reviewing the results of a population of patients extensively patch tested at the Skin and Cancer Foundation in Melbourne.

Patients and Methods

A retrospective study of patients patch tested at our tertiary referral Contact Dermatitis Clinic was undertaken. Data was collected from patients tested between April 1988 and January 1993. A detailed clinical history was obtained in each case. All patients were patch tested to the Skin and Cancer Foundation standard series (Table 1), to supplementary allergens (supplementary series) and to the patient's own products, as deemed appropriate by the examining dermatologist.

Allergens were supplied by Chemotechnique Diagnostics® (Malmö, Sweden) and Hermal® (Reinbek, Germany). These were applied to Finn Chambers® and affixed to the back with Scanpor® tape. Patches were removed and read at 2 days (D2) with a second reading at D4. The results of the tests were evaluated following the nomenclature and guidelines of the International Contact Dermatitis Research Group. The relevance of the reactions was evaluated by a dermatologist experienced in patch testing.

Results

817 patients were patch tested, of whom 436 (53%) had at least 1 positive reaction. Of these 436 patients, 316 (72%) were considered to have clinical relevance and hence a diagnosis of allergic contact dermatitis could be made. 63% percent of such patients were women.

Considering the 316 patients with relevant positive patch tests, 256 (81%) reacted to one or more allergens in the standard series, comprising 134 (42%) who reacted to standard series allergens alone, and 122 (39%) who had a positive reaction to at least one supplementary series allergen in addition. The remaining 60 (19%) patients reacted to supplementary series allergens only

Table 1. Frequency of positive reactions to standard series allergens in 316 patients with allergic contact dermatitis (INCI names in brackets, when different)

Allergens	Conc. (%)	No. positive reactions	No. clinically relevant reactions (% of pos. reactions)
nickel sulfate	5	70	50 (71)
balsam of Peru (Myroxylon Pereirae)	25	32	26 (81)
colophony (colophonium)	20	29	25 (86)
chlorocresol	2	6	2 (33)
p-phenylenediamine (PPD)	1	15	12 (80)
mercaptobenzothiazole (MBT)	2	10	9 (90)
formaldehyde	2	40	33 (83)
potassium dichromate	0.5	25	19 (76)
wool alcohols (lanolin alcohol)	30	8	5 (63)
epoxy resin	2	8	8 (100)
chloroxylenol	2	5	2 (40)
neomycin	20	11	6 (55)
cobalt chloride	1	45	21 (47)
imidazolidinyl urea	2	17	13 (76)
parabens mix	15	8	7 (88)
thiuram mix	1	34	30 (88)
mercapto mix	2	8	8 (100)
fragrance mix	8	65	58 (89)
black rubber mix	0.6	5	2 (40)
kathon CG (methylisothiazolinone + methylchlorisothiazolinone)	0.01	12	8 (67)
clioquinol	5	5	3 (60)
phenol-formaldehyde resin	1	3	2 (67)
ethylenediamine	1	16	10 (63)
PTBP*-formaldehyde resin	1	4	4 (100)
bronopol (2-bromo-2-nitropropane-1,3-diol)	1	1	1 (100)
quaternium-15	2	24	18 (75)
musk ambrette	1	0	0
caine mix	2	10	4 (40)
hydrocortisone in ethanol	2	3	1 (33)
cetyl stearyl (cetearyl) alcohol	20	5	2 (40)
propylene glycol	5	2	1 (50)
clobetasol 17-propionate	1	4	1 (25)
sorbitan sesquioleate	20	1	1 (100)
betamethasone dipropionate	1	5	2 (40)
betamethasone 17-valerate	1	5	1 (20)
alclomethasone 17, 21-dipropionate	1	7	1 (14)
hydrocortisone cream	1	3	1 (33)

* PTBT=p-tert-butylphenol-formaldehyde resin.

and did not react to any of the standard series allergens.

The frequency of positive reactions to the standard series allergens in the 316 patients and the proportion of clinically relevant reactions is shown in Table 1.

Discussion

A "standard series" of patch test allergens is accepted as a useful screening test for patients who may have allergic contact dermatitis. It such often stated that a standard series detects approximately 70% to 85% of such cases (1, 2). However, apart from the present study, there is little data in the literature to support such a claim. Our findings suggested that a diagnosis of allergic contact dermatitis could be made in 81% of cases using our standard series alone.

The component allergens in a standard series vary between regions and over time, making direct comparisons between centres difficult. In any series the detection rate would be expected to increase with the number of allergens used. The standard series used in the present study contained 37 allergens (Table 1). This compares with 24 allergens in the commercially available TRUE Test[®]. The North American Contact Dermatitis Group standard series comprises 50 allergens (3), while the European standard series has 22 and the Japanese standard series 25 allergens (4, 5). At the Skin and Cancer Foundation, the standard series has recently expanded to 50 allergens, with deletions and additions during the period of our study. Had the updated standard series been used, it would have diagnosed allergic contact dermatitis in 83% of patients, whereas the TRUE Test[®] would have detected 78% of patients (data not shown). The 10

most common contact allergens identified by our standard series were nickel sulfate, fragrance mix, cobalt chloride, formaldehyde, thiuram mix, balsam of Peru, colophony, potassium dichromate, quaternium 15 and imidazolidinyl urea. This is in broad agreement with a recently reported series from Western Australia (6).

The "gold standard" in diagnosing allergic contact dermatitis is the use of extensive patch testing with supplementary series of allergens and the patient's own sample products. Clinical relevance should be assessed by an accurate history and improvement of the dermatitis by subsequent avoidance of the allergen. We could find only 2 other reports aside from the current study in which extensive patch testing was performed and clinical relevance reported. The first study found that only 58% of allergic contact dermatitis patients had a reaction to a standard series allergen (7). A total of 221 patients were tested and the standard series consisted of 20 allergens. The authors' conclusion was that a standard series is of limited value as a screening tool. A recent report of 100 patients tested to the European standard series and additional allergens noted that, of the 38 patients with clinically relevant positive tests, 14 would have been missed had extensive testing not been performed (8). This suggested a detection rate of only 63% using a "limited" series of allergens. The results from this study must also cast doubts on the value of a screening standard series. Two other articles (9, 10) reported that a standard series alone was sufficient to diagnose allergic contact dermatitis in 36–73% of cases. Unfortunately, the clinical relevance of positive reactions was not stated in these reports.

The importance of applying supplementary allergens has been highlighted previously. In a study of 3664 patients who were tested with a standard series, 454 were also tested with additional supplementary series allergens (11). 75% of the 454 patients developed relevant positive reactions. However, the % of cases tested with additional substances was small and this group of patients was targeted as being likely to have allergic contact dermatitis on clinical grounds. It was noted that patients with cosmetic, plant and medicament allergies were often not detected by standard series allergens, whereas most rubber chemical allergies could be detected by the standard series. Supplementary allergens were more likely to be of importance in patients with occupational dermatoses: examples given were allergies to substances in the plastics and glue series, typified by acrylate sensitivity in dental technicians.

Occasionally patients develop allergies to multiple unrelated substances, and patch testing

with supplementary allergens may be needed to evaluate such cases fully. In the present study, although 81% would have been diagnosed with allergic contact dermatitis using the standard series alone, 122 (48%) of these 256 patients also reacted to at least 1 additional supplementary series allergen. In patients with multiple allergies avoidance of all identified allergens may be required for clinical improvement. Thus up to half of these patients may have been given inadequate advice had they been evaluated by the standard series alone.

In summary, our data raise questions about the usefulness of a standard series as a screening test for allergic contact dermatitis. While our finding of a detection rate of 81% is consistent with the acknowledged capability of this test, it needs to be asked whether or not a screening test which gives a false-negative result in 1 of every 5 cases is acceptable for use by the practising clinician. The value of screening with a standard series depends on a number of factors. These include the clinical indications for performing the test, the number of component allergens applied, their current relevance in a given community, and the likely source of the contact allergen, particularly if occupational. The notion that performing a screening test with a limited array of allergens is sufficient to exclude allergic contact dermatitis must be challenged. In cases of persistent or atypical dermatitis where this diagnosis is considered a possibility, comprehensive patch testing with the use of supplementary allergens is required to assess the patient fully.

Acknowledgements

We thank Kathryn Frowen, Clinical Nurse Specialist, for her time and assistance with this project.

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