

LETTER TO THE EDITOR

Suitability of patch test allergens for standard series in Thai patients: Ten-year retrospective review of patch test results

Dear Editor,

The patch test standard series represents the allergens that most commonly cause allergic contact dermatitis (ACD) in each population. Monitoring the standard series has proven helpful to detect changes in pattern of the allergens¹ which lead to revision of standard series to suit each population.² In Thailand, we have never had a consensus for our own patch test standard series but followed either the European Baseline Series (EBS) or International Standard Series (ISS). The Siriraj

Standard Series (SiSS) is the combination of both the EBS and ISS, with alteration of some allergens over the years in relation to changes of environmental exposure. The objective of this study was to provide the best of our standard series to suit Thai patients.

The Siriraj Institutional Review Board approved the use of clinical data from patients patch tested by the Contact Dermatitis Clinic, Siriraj Hospital, between January 2000 and December 2009. The patients suspected of having ACD who were

Table 1. Patch test results and ranking among three standard series

Allergens	Tested concentration (%)	Total (n = 852) n (% positive)	Ranking		
			SiSS	EBS	ISS
Gold sodium thiosulfate dihydrate	0.5 pet	259 (30.70)	1	–	–
Nickel sulfate ^{E,I}	5 pet	235 (27.60)	2	1	1
Potassium dichromate ^{E,I}	0.5 pet	177 (20.80)	3	2	2
Fragrance mix I ^{E,I}	8 pet	156 (18.30)	4	3	3
Cobalt chloride ^E	1 pet	136 (16.00)	5	4	–
Parabens ^E	16 pet	92 (10.80)	6	5	–
Neomycin sulfate ^{E,I}	1 pet	76 (8.90)	7	6	4
<i>Myroxylon pereirae</i> resin ^{E,I}	25 pet	72 (8.50)	8	7	5
Carba mix	3 pet	63 (8.20)	9	–	–
p-phenylenediamine ^{E,I}	1 pet	64 (7.50)	10	8	6
Colophonium ^{E,I}	20 pet	63 (7.40)		9	7
Methyldibromo glutaronitrile ^{E,I}	0.5 pet	47 (6.10)		10	8
Thiuram mix ^{E,I}	1 pet	50 (5.90)			9
Tetramethyl thiuram monosulfide	1 pet	18 (4.80)			–
Methylchloroisothiazolinone /methylisothiazolinone ^{E,I}	0.01 aq	39 (4.60)			10
Wool alcohols ^{E,I}	30 pet	34 (4.00)			
Sesquiterpene lactone mix ^E	0.1 pet	28 (3.30)			
4-Tert-butylphenolformaldehyde resin ^{E,I}	1 pet	27 (3.20)			
Mercaptobenzothiazole ^{E,I}	2 pet	27 (3.20)			
Formaldehyde ^{E,I}	1 aq	27 (3.20)			
Budesonide ^{E,I}	0.01 pet	25 (2.90)			
Mercapto mix ^{E,I}	2 pet	26 (3.10)			
Benzocaine ^E	5 pet	22 (2.60)			
Epoxy resin ^{E,I}	1 pet	20 (2.40)			
Ethylenediamine dihydrochloride	1 pet	18 (2.10)			
Imidazolidinyl urea ^I	2 aq	16 (2.00)			
N-Isopropyl-N-phenyl-4-phenylenediamine ^E	0.1 pet	14 (1.60)			
Quaternium-15 ^{E,I}	1 pet	13 (1.50)			
Quinoline mix ^E	5 pet	11 (1.30)			
Tixocortol-21-pivalate ^{E,I}	0.1 pet	10 (1.30)			

^IInternational Standard Series 20 substances.

^EEuropean Standard Series 25 substances. aq, in aqua; EBS, European Baseline Series; ISS, International Standard Series; PET, petroleum; SiSS, Siriraj Standard Series.

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Conflict of interest: none.

Table 2. Comparison of positive patch test results in clinical relevance among three standard series

Patch test results	n (%)		
	Siriraj Standard Series (30 allergens)	European Baseline Series (25 allergens)	International Standard Series (20 allergens)
Positive at least 1	692 (81.2%)	627 (73.6%)	572 (67.1%)
Clinical relevance at least 1	390 (56.4%)	396 (46.5%)	343 (60.0%)
Positive rate/clinical relevance ratio	1.44	1.58	1.12

referred to our clinic and patch tested with the SiSS, mainly based on the EBS and ISS, except for primin and lyral, which were just added to both standard series in 2008. Four allergens – gold sodium thiosulfate dehydrate, ethylenediamine dihydrochloride, tetramethyl thiuram monosulfide (TMTM) and carba mix – were added. TMTM was removed from the SiSS in 2004 because it was included in the thiuram mix and gave the same rate of positivity. Patch testing allergens (Chemo-technique Diagnostics, Vellinge, Sweden), aluminum Finn Chambers (SmartPractice, Phoenix, AZ, USA), method and interpretation were followed in accordance with the guidelines of the International Contact Dermatitis Research Group.³ The data were analyzed with descriptive statistics (SPSS ver. 18; SPSS, Chicago, IL, USA).

Over a period of 10 years (2000–2009), a total of 852 patients, 646 female (75.8%) and 206 male (24.2%), were patch tested with our SiSS. The average age of the patients was 39.14 ± 14.1 years (mean $\pm$ standard deviation; range, 10–85 years). The patch test results of SiSS allergens and top 10 ranking in the 2000s are summarized in Table 1. Positivity and clinical relevance (CR) rates of each series are shown in Table 2. There was no statistically significant difference in trend of positive patch test reactions for individual allergens during the 2000s.

The standard series is the set of allergens that frequently cause ACD (>50%) in the specific population being patch tested. The number and specificity of allergens in the series vary from country to country.¹ For instance, Korea, India, Belgium, Italy, Sweden and the North American Contact Dermatitis Group have their own standard series which is judged to be appropriate for their population being tested.¹ The SiSS tests 30 allergens, which is more than the EBS and ISS which test 25 and 20 allergens, respectively. All three standard series can detect common allergens causing more than 50% of ACD in our patients. Fregert, quoted by Bruze *et al.*,⁴ suggested including any allergen to a standard series when more than 0.5–1% of tested patients react positively. All of our 30 allergens fulfilled this criterion.

The maximum benefits of a patch test series are yielding a high positivity rate and high CR in the population; the ratio of percentage positive patch test to percentage CR should be

close to 1. In view of this ratio, the ISS demonstrates the lowest ratio of 1.12 followed by the SiSS (1.44) and EBS (1.58) from our data. Therefore, the ISS would be the most beneficial standard series for our population. But we would still miss four of our top 10 common allergens: gold, cobalt, parabens and carba mix.

Gold sensitization is quite high worldwide (2.1–13%). It was the allergen of the year in 2001.⁵ Gold showed the highest positive reaction rate in our study. The high exposure from gold jewelries and gold leaf, a very thin gold plate, which can be absorbed through skin may explain the high rate of sensitization in Thais. Thais have a traditional of giving a gold bangle as a birth gift to console the child's spirit. Gold sensitization was more common in females, at 80.3%. There is currently increasing use of gold threads, gold-containing cosmetics and gold-containing dental restoration materials; for that reason, we need to watch closely for gold allergy.

Analysis of our patch test reaction rates allows us to propose a beneficial, broad, clinically relevant and up-to-date set of allergens for baseline patch testing in the Thai population. We conclude that the ISS, with the addition of gold, cobalt, parabens and carba mix, is suitable for detection of ACD in Thailand.

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