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Contact allergy trends in Singapore – a retrospective study of patch test data from 2009 to 2013

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Identifying trends in contact allergies assists in tackling emerging epidemics.

Methods

We retrospectively analysed patch test results of the National Skin Centre, Singapore, between 1 January 2009 and 31 December 2013. We included all patients with suspected allergic contact dermatitis who were tested with a modified European baseline series. Patch testing was performed by the use of Finn Chambers® on Scanpor® tape, with allergens from Chemotechnique Diagnostics (Vellinge, Sweden), and exposure on the back for 48 h. Reading of the tests was performed on day (D) 3 and D7, according to the recommendations of the ICDRG (1).

Results

A total of 2598 patients (43.3% male; mean age 43.0 years) were patch tested. Of these, 47.1% had a reaction to at least one allergen. A personal history and a family history of atopy were detected in 20.4% and 12.4% of patients, respectively. Allergy to nickel was the most common finding, accounting for 23.9% positive reactions. The next most common allergens included fragrance mix I (6.7%) and *p*-phenylenediamine (6.2%) (Table 1).

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Discussion

Our data show an increase in the prevalence of nickel contact allergy from 20.5% between 2004 and 2008 (2) to a concerning level of 23.9%. This epidemic mirrors results from other Asian countries (3). Moreover, prevalences are higher than in European countries such as Denmark, where legislative measures limit nickel release from nickel-containing products (4). Such measures have yet to be taken locally to address the epidemic of nickel contact allergy. Additionally, there was a statistically significant predominance of nickel allergy in females (32.9%) as compared with males (13.0%) ($p < 0.05$). This may be explained by higher exposure to nickel-containing costume jewellery in women.

Interestingly, there were no significant increases in the frequencies of methylchloroisothiazolinone (MCI) and methylisothiazolinone (MI) sensitization over the years. This is in contrast to the epidemic of MCI/MI contact allergy in Europe and Korea, where a doubling of contact allergy prevalences has been described (5). The increased use of MCI/MI, at least in Europe, could be explained by the use of alternative preservatives to methyl dibromoglutaronitrile following the prohibition of its use in cosmetic products in 2008 (5). In countries such as Japan, the use of MCI/MI is prohibited in leave-on products (6). The relative popularity of Japanese cosmetic products in Singapore could explain the lower frequency of MCI/MI sensitization.

In conclusion, the changing epidemiology of contact allergy reflects the varying occupational landscape and lifestyle of Singaporeans.

Table 1. Allergens of the baseline series ranked by relative frequency (%) of positive reactions, stratified by year, between 2009 and 2013

	Year						Past and present relevance
	2009	2010	2011	2012	2013	Mean	Mean
Nickel sulfate	25.8	27.2	24.0	22.0	20.5	23.9	6.3
Fragrance mix I	7.8	8.0	6.4	6.1	5.0	6.7	2.5
<i>p</i> -Phenylenediamine	6.0	6.1	5.9	6.6	6.6	6.2	0.4
Colophonium	5.3	4.4	4.4	5.7	3.2	4.6	6.0
Potassium dichromate	7.3	4.4	4.2	3.2	3.9	4.6	1.1
<i>Myroxylon perei</i> (balsam of Peru)	2.5	4.4	6.2	3.7	4.2	4.2	1.6
Fragrance mix II	5.0	3.6	5.4	2.5	3.2	3.9	0.8
Neomycin sulfate	2.8	2.8	1.7	1.7	3.4	2.5	0.5
Hydroxyisohexyl 3-cyclohexene carboxaldehyde	2.5	2.5	2.2	1.0	1.1	1.9	0.5
Thiuram mix	2.8	2.2	1.5	1.5	1.3	1.9	0.2
Methylchloroisothiazolinone/methylisothiazolinone (3:1) aq.	2.5	0.6	2.8	1.2	1.8	1.8	0.0
Quaternium-15	1.8	1.9	1.2	2.7	0.8	1.7	0.4
Proflavine hemisulfate	1.0	2.5	1.2	0.5	0.8	1.2	0.1
Paraben mix	2.0	0.8	1.0	1.0	0.3	1.0	0.0
Epoxy resin	1.0	1.4	0.7	1.0	0.8	1.0	0.1
<i>p</i> - <i>tert</i> -Butylphenol formaldehyde resin	0.7	0.3	0.5	1.0	1.1	0.7	0.0
Lanolin alcohol	1.0	0.3	1.5	0.5	0.3	0.7	0.0
Methyldibromo glutaronitrile	0.5	1.1	1.5	0.2	0.0	0.7	0.1
Quinoline mix	0.3	0.6	0.0	0.0	1.3	0.4	0.0
2-Mercaptobenzothiazole	0.0	0.6	0.0	0.5	0.5	0.3	0.0
Tixocortol-21-pivalate	0.3	0.3	0.0	0.7	0.3	0.3	0.0
Budesonide	0.3	0.3	0.5	0.3	0.0	0.3	0.0
Sesquiterpene lactone mix	0.8	0.0	0.5	0.0	0.0	0.3	0.0
Mercapto mix	0.3	0.3	0.0	0.0	0.3	0.2	0.0
Formaldehyde 1 aq.	0.0	0.0	0.0	0.0	0.3	0.2	0.0
Betamethasone-17-valerate	0.0	0.0	0.2	0.0	0.0	0.1	0.0
<i>p</i> -Chloro- <i>m</i> -cresol	0.3	0.0	0.0	0.0	0.0	0.1	0.0

Allergens in pet., except where indicated otherwise. Relevance was classified into four categories, as follows. (i) Present: the allergen is causing the current dermatitis. (ii) Past: the allergen had caused dermatitis in the past but is of no current relevance. (iii) Exposed: the allergen had been encountered by the patient before, but the patient did not develop dermatitis at that time. (iv) Unknown: no known exposure. Only categories (i) and (ii) were considered to be relevant for the rightmost column.

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