Contact Dermatitis 1992: **26:** 112–115

Allergic contact dermatitis in children

S. Gonçalo, M. Gonçalo, A. Azenha, M. A. Barros, A. Sousa Bastos, F. M. Brandão, A. Faria, M. S. J. Marques, M. Pecegueiro, J. B. Rodrigues, E. Salgueiro and V. Torres

A Multicenter study of the Portuguese Contact Dermatitis Group (GPEDC)

The authors report a study of allergic contact dermatitis in 329 Portuguese children of 14 years or younger. 170 children (64 male and 106 female) reacted to 1 or more allergens. Most of these were in the 11–14 years group. The main allergens were nickel, thimerosal, cobalt, mercury, fragrance-mix and potassium dichromate. Nickel reactivity predominated in females over the whole group, but a greater number of males younger than 5 years reacted to nickel. The number of positive reactions increased with age, but this was not accompained by an increase in the % of relevant tests. 12 children, all of them 13 or 14 years-old, had an occupational allergic contact dermatitis.

Key words: allergic contact dermatitis; children; multicenter study; occupational; nickel; thimerosal; cobalt; mercury; fragrance-mix; chromate.

Accepted for publication 6 August 1991

Allergic contact dermatitis is uncommon in young children (1). Only occasional cases of allergic contact dermatitis have been reported in the 1st year of life (2–5). Allergic contact dermatitis becomes more frequent with increasing age, especially after the first decade (2, 6, 7), as the number and potency of environmental allergens increases, mainly in the field of work (1).

To determine the characteristics and causes of allergic contact dermatitis in Portuguese children, we evaluated the results of children who were patch tested by the members of the Portuguese Contact Dermatitis Group (GPEDC) between 1985 and 1989.

Patients and Methods

During this 5-year period, 329 (142 male and 187 female) of the 10,191 patients patch tested for contact dermatitis were 14 years old or younger (3.2%). All patients were patch tested with the standard series of allergens of the Portuguese Contact Dermatitis Group (Trolab) and with additional series indicated by clinical data. Patch tests were read at 2 and 3 or 4 days, according to ICDRG guidelines.

In the group of 170 children with at least 1 positive patch test, we studied the localization and cause of the dermatitis. Allergens that elicited positive patch tests, the number of positive reactions per patient and their relevance were evaluated over the whole group and within different sex and age subgroups (0–5 years, 6–10 years and 11–14 years old).

Results

Among the 170 reactive children (64 males and 106 females), the distribution by sex and age subgroups was as follows: 0–5 years, 18 patients (14 male/4 female); 6–10 years, 41 patients (17 male/24 female); and 11–14 years, 111 patients (33 male/78 male). The younger children with positive patch tests were 2 years-old. 65.3% were 11 to 14 years-old. Females outnumbered males and displayed a higher reactivity (56.7% versus 45.1%).

Hands and feet were involved in about 1/2 the patients, followed, in decreasing order of frequency, by the earlobes, face and neck, periumbilical region and wrists. Dermatitis was caused mainly by metallic objects on clothing and jewelry (46 cases), topical medicaments (29 cases), footwear (21 cases), cosmetics (9 cases), plants (8 cases), hair dyes (3 cases), cleaning agents (3 cases) and cement (2 cases). The cause was unknown in 39 cases.

The most frequent allergens in the standard series were: nickel sulphate – 21.5%, thimerosal – 11.2%, cobalt chloride – 7.2%, ammoniated mercury – 6.1%, fragrance-mix – 4.2% and potassium dichromate – 2.7% (Table 1). Other positive tests are shown in Tables 1 and 2.

Nickel was more frequent in female patients over the whole group (female 28.8% versus male 11.9%), but predominated in males in the younger age group (0–5 years) (7/14 males versus 1/4 females). For other allergens, no significant differences were found between age groups and sexes.

The number of positive reactions per patient increased with age: 2 or more positive reactions were observed in 5/18 (27%), 15/41 (36%) and 56/111 (50%), in the 0–5, 6–10 and 11–14 years age groups, respectively.

Table 2. Other positive patch test results

Allergens	Males	Females	Total
Plants	2	6	8
garlic	–	5	5
frullania	–	1	1
mango fruit	1	–	1
chrysanthemum sp.	1	–	1
Topical medicaments	5	3	8
Viru-Merz (tromantadine)	2	1	3
Hirudoid	1	–	1
other	2	2	4
Textile dyes	3	2	5
p-aminophenol	–	1	1
Disperse Orange 3	–	1	1
Disperse Yellow 3	1	–	1
Disperse Red 1	1	–	1
Bismarck Brown	1	–	1
footwear (as is)	3	–	3
cosmetic creams	–	2	2
others	1	2	3

Table 1. Positive patch tests in the standard series among 329 children (142 males/187 females)

Allergens	Males		Females		Total	
	no.	(%)	no.	(%)	no.	(%)
nickel sulphate 5% pet.	17	11.9	54	28.8	71	21.5
thimerosal 0.1% pet.	16	11.2	21	11.2	37	11.2
cobalt chloride 1% pet.	7	4.9	17	9.0	24	7.2
ammon. mercury 1% pet.	10	7.0	10	5.3	20	6.1
fragrance-mix 8% pet.	7	4.9	7	3.7	14	4.2
pot. dichromate 0.5% pet.	4	2.8	5	2.6	9	2.7
PPD 0.5% pet.	1	0.7	5	2.6	6	1.8
caine-mix 7% pet.	2	1.4	4	2.1	6	1.8
PTBPF resin 1% pet.	1	0.7	4	2.1	5	1.5
black-rubber-mix 0.6% pet.	4	2.8	–		4	1.2
thiuram-mix 1% pet.	2	1.4	2	1.06	4	1.2
colophony 20% pet.	2	1.4	1	0.53	3	0.9
wool alcohols 30% pet.	2	1.4	1	0.53	3	0.9
balsam of Peru 25% pet.	3	2.1	–		3	0.9
formaldehyde 1% aq.	1	0.7	2	1.06	3	0.9
paraben-mix 15% pet.	–		2	1.06	2	0.6
mercapto-mix 2% pet.	2	1.4	–		2	0.6
neomycin 20% pet.	1	0.7	–		1	0.3
quinoline-mix 6% pet.	1	0.7	–		1	0.3
ethylenediamine 1% pet.	–		1	0.53	1	0.3

Table 3. Occupational contact dermatitis (13–14 years old); occupations and related allergens

	M	F	Total	Allergens
hairdressers	–	5	5	PPD (3); nickel (1); thiuram (1)
construction workers	2	–	2	chromium (2); cobalt (2)
food industry	1	1	2	garlic (2); nickel (1)
footwear industry	–	2	2	chromium (1); cobalt (1); nickel (1)
ceramic industry	–	1	1	cobalt (1); nickel (1)
total	3	9	12	

In 131 of the 170 patients (65.3%), positive reactions were relevant, but this % varied with age: 0–5 years – 94.4%; 6–10 years – 68.3%; and 11–14 years – 77.5%. 12 patients (7%), all of them 13 or 14 years old, had an occupational allergic contact dermatitis (Table 3).

Discussion

Allergic contact dermatitis in children is not rare (2), especially if we include patients older than 10 years, as in our group.

51.7% of children had positive reactions, which is very similar to the % of reactivity of the 10,191 patients of all ages patch tested by the GPEDC over the same period (56.1%). Different studies have found different %s of reactivity in children (12–71%), depending on selection criteria: age limits (7) and type of population tested – normal children (3, 8), atopics (9) or children with allergic contact dermatitis (2, 4, 7, 9, 11).

As in previous studies, we found an increasing frequency of contact dermatitis with age (2, 6, 10, 13). Furthermore, polysensitization becomes more apparent in older children, though we stress that the increasing number of positive patch test reactions per patient does not run parallel with the number of relevant patch test reactions, which tend to decrease in children older than 5 years.

In agreement with other studies, in our group, metals were the main allergens (4, 6, 14–16) and reactivity to nickel was commoner in females (5, 15, 17, 18). In contrast, we observed a male predominance for nickel reactions in the younger patients (0–5 years), as in a previous study by Gonçalo et al. (4). Also, Veien et al. (10) and Rademarker & Forsyth (14) did not find any sex difference in nickel reactivity in the same age group. Although contact with metals in jewelry and clothing increases with age, especially in girls, factors beyond environmental contact, namely endocrinologic influence on immune reactivity (18, 19), may account for the predominant sensitivity to nickel in older females.

Like several other authors (8, 10, 12), we agree that patch testing in children should be done in the investigation of allergic contact dermatitis, as the risks are few, even using the same patch test concentrations as for adults (8). Also, the results are often relevant – 65.3% in our group and 84% in Kuiters et al.'s (12) group – and may be very helpful in the identification of environmental and occupational allergens, mainly in children older than 10 years, and for giving advice concerning future occupations.

References

1. Garcia-Bravo B. Dermatitis de contacto en la infancia. *Piel* 1990: *5:* 220–227.
2. Levy A, Hanau D, Foussereau J. Contact dermatitis in children. *Contact Dermatitis* 1980: *6:* 260–262.
3. Aihara M, Ikezawa Z. Neonatal allergic contact dermatitis. *Contact Dermatitis* 1988: *18:* 105.
4. Gonçalo S, Sousa I, Freitas J D. Eczema de contacto na criança. *Acta Médica Portuguesa* 1984: *5:* 87–90.
5. Camarasa J M G, Aspiolea F, Alomar A. Patch tests to metals in childhood. *Contact Dermatitis* 1983: *9:* 157–158.
6. Brandão F M. Eczema de contacto na infância. *Rev Portuguesa de Pediatria* 1983: *14:* 77–80.

7. Rudzki E, Grzyva Z, Rebandel P. Patch testing in children. *Contact Dermatitis* 1987: *17:* 117–118.
8. Weston W L, Weston J A, Kinoshita J, Kloepfer S, Carreon L, Toth S, Bullard D, Harper K, Martinez S. Prevalence of positive epicutaneous tests among infants, children and adolescents. *Pediatrics* 1986: *78:* 1070–1074.
9. Angelini G, Meneghini C L. Contact and bacterial allergy in children with atopic dermatitis. *Contact Dermatitis* 1977: *3:* 163–164.
10. Veien N K, Hattel T, Justesen O, Norholm A. Contact dermatitis in children. *Contact Dermatitis* 1982: *8:* 373–375.
11. Fregert S, Möller H. Contact allergy to balsam of Peru in children. *Brit J Dermatol* 1963: *75:* 218.
12. Kuiters G R R, Smitt H S, Cohen E B, Bos J D. Allergic contact dermatitis in children and young adults. *Arch Dermatol* 1989: *125:* 1531–1533.
13. Pevny I, Brennenstuhl M, Rasinskas G. Patch testing in children (I). Collective test results; skin testability in children. *Contact Dermatitis* 1984: *11:* 201–206.
14. Rademaker M, Forsyth A. Contact dermatitis in children. *Contact Dermatitis* 1989: *20:* 104–107.
15. Romaguera C, Alomar A, Camarasa J M G, Garcia-Bravo B, Garcia-Perez A, Grimalt F, Guerra P, Gorretcher B L, Pascual A M, Miranda A, Moran M, Pena M L. Contact dermatitis in children. *Contact Dermatitis* 1985: *12:* 283–284.
16. Larsson-Stymne B, Widstrom L. Ear-piercing – a cause of nickel allergy in schoolgirls? *Contact Dermatitis* 1985: *13:* 289–293.
17. Pambor M, Winkler S, Block Y. Allergic contact dermatitis in children. *Contact Dermatitis* 1991: *24:* 72–74.
18. Veien N K, Hattel T, Justesen O, Nørholm A. Why do young girls become nickel sensitive? *Contact Dermatitis* 1986: *15:* 306–307.
19. Silvennoinen-Kassinen S, Isotalo H, Jakkula H. Estradiol enchances nickel-induced blast transformation. *Contact Dermatitis* 1984: *11:* 260–261.

Address:

Saudade Gonçalo
Clinica de Dermatologia
Hospitais da Universidade de Coimbra
3000 Coimbra
Portugal