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Epicutaneous Patch Test Reactions in Atopic Dermatitis Patients

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SUMMARY During the 1998-2003 period, patch testing was carried out in 65 atopic dermatitis patients, 20 (31%) male and 45 (69%) female, mean age 34.7 (range 6-77) years. Twenty-six (40%) patients, 7 (27%) male and 19 (73%) female, showed positive reaction to one or more allergens. Allergic reactions were more common in women. The most common allergens were nickel (33.3%), cobalt (11.1%), fragrance mix (11.1%), white mercury precipitate (8.4%), and others (36.1%). There was a significant association between nickel allergy and cobalt allergy. It is concluded that contact hypersensitivity is not rare in patients with atopic dermatitis.

KEY WORDS atopic dermatitis; epicutaneous patch test; contact sensitivity

INTRODUCTION

Atopic dermatitis (AD) is a common chronic inflammatory skin disease, which generally breaks out in early infancy. The main characteristics of the disease are symptoms such as rash, vesicles, and itching. Family history of atopy has confirmed that AD must have a distinct genetic background. There is increased evidence for T-cell response to environmental allergens to play a role in the pathogenesis of AD (1). The predominance of AD has increased during the past 20-30 years, its lifetime predominance being estimated to 10% to 15% (2). There are many factors including allergens, infections, emotional, climatic and other environmental influences that contribute to the causation of AD in genetically predisposed individuals (3).

The aim of this study was to evaluate contact sensitivity to standard patch test allergens in AD patients.

SUBJECTS AND METHODS

During the 1998-2003 period, epicutaneous patch testing was carried out in 65 patients, 20 (31%) male and 45(69%) female, mean age 34.7 (range 6-77) years, with AD meeting the criteria of Hanifin and Rajka (4), free of oral steroids and antihistamines for at least 7 days. Epicutaneous patch test was performed with a standard series of epicutaneous allergens (Table 1), obtained from Institute of Immunology, Zagreb, Croatia. Test substances were applied on the upper part of the patient back, on clinically uninvolved, untreated and non-tape stripping skin, with adhesive patch test strips (Curatest, Lohmann-Rauscher, Rensdorf, Germany). Patch test strip was removed and reaction was evaluated after 48 and 72 hours. Positive patch test reactions were graded from + to ++++, according to the International Contact Dermatitis Research Group (ICDRG) rules (5).

RESULTS

Twenty-six (40%) patients, seven (27%) male and 19 (73%) female, showed positive reaction to one or more allergens. Allergic reactions were more frequently found in women. The most

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Table 1. Standard series of allergens used in patch testing

Allergen	Dilution (%) vehicle	Allergen	Dilution (%) vehicle
1 Potassium dichromate	0.5 petrolatum	12 PPD-black rubber mix	0.1 petrolatum
2 Cobalt chloride	1.0 ¨	13 Thiuram mix	1.0 ¨
3 Nickel sulfate	5.0 ¨	14 Carba mix	3.0 ¨
4 Fragrance mix	8.0 ¨	15 Wood tars	12.0 ¨
5 p-paraphenylenediamine	0.5 ¨	16 Neomycin sulfate	20.0 ¨
6 Balsam of Peru	25.0 ¨	17 Parabene mix	15.0 ¨
7 Epoxy resin	1.0 ¨	18 Lanolin alcohol	30.0 ¨
8 Colophony	20.0 ¨	19 Formaldehyde	1.0 water
9 White mercury precipitate	10.0 ¨	20 Detergent	2.0 ¨
10 Benzocaine	5.0 ¨	21 Thimerosal	0.1 petrolatum
11 Mercapto mix	2.0 ¨	22 Petrolatum	As it is

common allergen was nickel sulfate (33.3%), followed by cobalt chloride (11.1%), fragrance mix (11.1%), white mercury precipitate (8.7%), and others (36.1%) (Fig. 1). Concordance between nickel allergy and cobalt allergy was observed. All other allergens showed lower predominance on patch testing.

DISCUSSION

Positive epicutaneous patch test reactions in AD patients are reported. There is no doubt that patients with AD can acquire allergic contact sensitization and often need to be patch tested (6,7). Patch-test results from 9 countries (2322 patients with AD predisposition and 2126 matched controls) were retrospectively evaluated. All patients were tested with nickel sulfate, fragrance mix, potassium dichromate, lanolin alcohol, formaldehyde, and mercury ammonium chloride (at corresponding dilutions and vehicles). As expected, compared to matched controls, patients with a predisposition to AD tended to have more suspect and irritant reactions on the first day. As a new observation, it turned out that less reactions of a crescendo pattern and stronger reactions were observed on the third day. All differences were statistically nonsignificant (8).

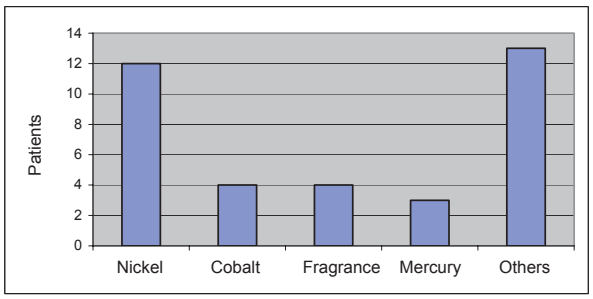

Figure 1. Results of patch testing in atopic dermatitis patients

In a total of 410 subjects, 197(48%) were diagnosed with relevant allergic contact dermatitis after extensive patch testing. In 148 (36%) subjects all patch tests were negative, whereas 189 (46%) were atopic. Among 189 atopic subjects, 102 (54%) had relevant contact allergy. This percentage exceeded 45% of non-atopics with allergic contact dermatitis. The percentage of atopics with irritant reactions (22%) was not different from non-atopics (20%). These findings highlight the need of careful surveillance of patch tests using well-defined parameters to distinguish irritant reactions from relevant contact allergic reactions (9).

Lamintausta *et al.* studied 851 AD patients divided according to age groups into group 1 aged 28-41 and group 2 aged 19-27. The frequency of positive patch test reactions varied between patient groups from 25% to 67%. The frequency among older AD patients was slightly higher (57%) in comparison with the younger group (42%). Those AD patients who had a longer history of severe symptoms developed positive reactions most often (67%) (10).

According to the literature, the occurrence of contact allergy among AD patients ranges beetwen 0.1% and 57% (11-14), depending on the population tested and the allergen used (10). De Groot used European standard series to study 214 AD patients, and found 37% of atopic subjects to have at least one positive patch test reaction (15).

In 73 adult AD patients tested, Lever and Forsyth recorded one or more positive patch test reaction in 31 (42%) patients. The most common

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allergens were fragrances in 13, nickel in 7, rubber in 5, lanolin in 4, and formaldehyde in 3 patients (6).

Our results on 40% positive patch test reactions in AD patients have confirmed those from a previous study, that AD patients often become sensitive to contact allergens. The most common allergen was nickel sulfate (10,16), followed by cobalt chloride (17). Cobalt allergy was also more frequently observed in women, and was often associated with nickel allergy (18), as in our patients. The persons with atopy showed altered cell-mediated immunity and therefore a decreased capacity to develop contact allergy. This trend has particularly been proposed for severe AD patients (14). Contact sensitization is frequent among AD patients. Thus patch testing is highly warranted during the course of the disease. The number of patch test reactions increased with age (10).

In AD patients, positive contact allergens penetrate the epidermal skin barrier more easily due to its lipid barrier lesion. These allergens include nickel, latex, vehicle of external preparations, fragrances, etc. Furthemore, irritant agents such as wool or disinfectants might lead to some exacerbation of the disease. Therefore, avoidance or even reduction of these factors in the environment should be one of the basic principles in the management of the disease (19).

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