

Airborne allergic contact dermatitis

E. Nettis, M. C. Colanardi, A. Ferrannini, A. Tursi

Key words: airborne allergic contact dermatitis; latex allergy; occupational allergy; rubber gloves.

• THERE are type I and type IV allergens in latex products. Type IV allergens are additives including thiurams, dithiocarbamates, benzothiazoles, paraphenylenediamines, and thioureas (1). Latex itself may be added to this list of type IV allergens (2).

We describe the case of a 31-year-old woman with a 1-year history of occupational dermatitis with

Occupational allergy to latex.

eczematous lesions widespread over the neck, shoulders, and face (retroauricular folds and eyelids). She worked as a nurse in surgical care and had frequent contact with medications such as disinfectants and antiseptics. All members of the surgical unit where she worked wore rubber gloves for over 5 h a day; three sets of gloves were used per day. However, our patient wore vinyl gloves. She had not worn rubber gloves for several months because of previous episodes of contact dermatitis caused by them.

The patient stopped working in direct surgical activities and transferred to administrative work in the department; her symptoms spontaneously disappeared immediately after her transfer to administrative works. They presented again after several hours when she returned to her original occupation in the surgical unit.

She had no history of atopy and no symptoms outside the workplace.

The patient underwent full allergologic examination:

1) Total IgE in the patient's serum was measured by PRIST (CAP System FEIA); the result was 78.2 kU/l.

2) The RAST was done for latex. A positive reaction was defined as >0.35 kU/l; in this case, no specific IgE was detected.

3) Skin prick tests (SPTs) were done with nonammoniated commercial latex extract (Stallergènes, Paris, France) and with glove extracts prepared as previously reported (3). Histamine chloride (0.1%) and NaCl (0.9%) were used as positive and negative controls, respectively; the SPTs were negative.

4) A glove use test was performed; it was negative (4).

5) A patch test with immediate (after 30 min) and delayed (after 48 and 72 h) readings was performed for latex and 23 occupational airborne contact allergens (Table 1). The patch preparations were applied with Finn Chambers on Scampor according to IRDGC recommendations (5). Two haptens for latex were used: ammoniated latex supplied by the Rubber Research Institute of Malaysia (0.7% by weight) and commercial latex without ammonia (Chemotecnique Diagnostics AB, Sweden). The immediate reading of the patch test was negative, while the delayed reading was positive for latex haptens.

In this case, the presence of eczema mainly on air-exposed areas is a sign that airborne latex probably provoked the symptoms. These occurred without direct contact, suggesting that the patient was already sensitized to latex, probably by previous use of rubber gloves. IgE-mediated latex allergy is characterized by urticaria, angioedema, rhinitis, conjunctivitis, bronchospasm, and anaphylaxis (1).

Hypersensitivity type IV reactions to latex proteins were suspected, and a previously published report of IgE-mediated urticaria and allergic contact dermatitis

from latex in the same individual supports this as a pathogenic mechanism (6). Mahamoudi et al. (2) described a patient with airborne contact dermatitis without the execution of latex patch testing in IgE-mediated latex allergy. Our study for the first time describes a case of airborne allergic contact dermatitis to latex proteins. This was documented both by clinical symptoms, the typical localization, and positive patch tests with latex.

A reduction in aeroallergen levels by using low-latex, nonpowered gloves is necessary to prevent airborne allergic contact dermatitis from latex.

Acknowledgments We thank H. Y. Yeang, Head, Biotechnology and Strategic Research Unit, Rubber Research Institute of Malaysia, for advice and for supplying the sample of ammoniated-preserved latex concentrate, and Dr Giovanni F. M. Strippoli.

Table 1. List of occupational airborne allergens tested

Latex as is
Latex (commercial extract)
Carba mix 3% pet
Thiuram mix 1% pet
Diphenylthiourea 1% pet
Dibutylthiourea 1% pet
Diethylthiourea 1% pet
Ethylenethiourea 1% pet
Formaldehyde 1% aq
Chlorhexidine digluconate 0.5% aq
Benzalkonium chloride 0.1% aq
Glutaraldehyde 0.5% aq
Hexachlorophene 1% pet
Nickel sulfate 5% pet
Perfume mix 6% pet
Colophony 20% pet
Epichlorhydrin 0.1% et
Thimerosal 0.1% pet
2-Methyl-4-isothiazoline-3-one 0.01% aq
Hexamethylenetetramine 2% pet
Cobalt chloride 1% pet
Epoxy resin 1% pet
4-tert-Butylphenol formaldehyde resin 1% pet

pet: petrolatum; aq: aqueous; et: ethanole.

*Cattedra di Allergologia e Immunologia
Clinica
Padiglione Chini – Policlinico
Piazza Giulio Cesare
70124 Bari
Italy
Tel. 039 080 5592821
Fax: 039 080 5478780
E-mail e.nettis@allergy.uniba.it

Accepted for publication 20 February 2001
Allergy 2001; 56:583–584
Copyright © Munksgaard 2001
ISSN 0105-4538

References

1. YUNGER JW. Latex allergy in the workplace: an overview of where we are. *Ann Allergy* 1999;**83**:630–633.
2. MAHAMOUDI M, DINNEEN AM, HUNT LW. Simultaneous IgE-mediated urticaria and contact dermatitis from latex. *Allergy* 1998;**53**:1009–1010.
3. TURJANMAA K, REUNALA T, RASANEN L. Comparison of diagnostic methods in latex surgical glove contact urticaria. *Contact Dermatitis* 1988;**19**:241–247.
4. RUEFF F, THOMAS P, REIBIG, PRZYBILLA B. Natural rubber-latex allergy in patients not intensely exposed. *Allergy* 1998;**53**:445–449.
5. WILKINSON DS, FREGERT S, MAGNASSON B, et al. Terminology of contact dermatitis. *Acta Derm Venereol* (Stockh) 1970;**50**:287–292.
6. PANASOFF J. Airborne contact dermatitis to latex. *Allergy* 1998;**53**:1228.

Ficus antigen in dust

M. Faller, J. C. Bessot, F. Lieutier-Colas, E. Lett, D. Wachsmann, G. Pauli, F. de Blay*

Key words: airborne levels; domestic dust; ELISA; *Ficus benjamina*.

• RESPIRATORY allergy to *Ficus benjamina* (*F.b.*) (weeping fig) is a type of indoor plant allergy (1). The first cases of sensitization to *F.b.* were reported in 1985 in plant keepers. Of workers exposed to *F.b.* during their

occupational activity, 21% have been reported to have symptoms and sensitization to *F.b.* (2). Of subjects exposed in the domestic environment, 6% have been reported to be sensitized to *F.b.*, with 3% symptomatic to *F.b.* (3). The aim of the study was to determine whether *F.b.* antigen could be detected by polyclonal antibody-based assay in house dust as well as in the air from carpeted and uncarpeted rooms.

Experimental design. Dust samples were collected under the plants, which were set on carpeted floors (20 dwellings) and on uncarpeted floors ($n=11$). There was always one plant per house located in the living room. *F.b.* antigens were measured in the dust of rugs and sofas located at 3 m from the plant and in the dust of mattresses in the nearest bedroom. To determine the time necessary to obtain measurable *F.b.* dust levels, one plant was set on a plastic floor in an experimental room for 45 days. Then, a 2 m² synthetic rug was placed under the plant for 45 days.

House-dust samples and extracts were obtained according to the international recommendations (4).

Airborne measurements were performed twice for each dwelling for 8 h with a glass-fiber filter connected to a portable pump, as previously described (5).

F.b. allergen extracts were prepared as described by Axellson & Zetterström (6). The sap contained 4.6 mg/ml of protein.

Polyclonal antibody preparation. A rabbit was immunized with *F.b.* extracts, receiving each time 150 µg of protein. Blood was drawn 5 days after the last injection, and the serum was stored. The precipitate was replaced in suspension and

dialyzed. The antibodies were precipitated and purified on a diethylamino-ethyl column. The eluted IgG concentration was 2.3 mg/ml.

Polyclonal antibody ELISA procedure. Microplates were coated with rabbit IgG anti-*F.b.* The plates were washed and incubated with 0.5% BSA in PBS-Tween 20. *F.b.* antigen standard solution (0.12–125 mAU (arbitrary unit)/ml) or dilutions of dusts and airborne sampling extracts were added. Biotinylated rabbit IgG anti-*F.b.* was first added, and then streptavidine-peroxydase. The plates were developed with ABTS and read at 405 nm.

Statistical analysis. Mean values were compared by unpaired Student's *t*-test. Statistical significance was considered to be at the $P<0.05$ level.

***F.b.* polyclonal ELISA.** The ELISA sensitivity was 0.17 mAU/ml ($n=12$). No detectable cross-reactivity between *F.b.* antigen and the most common aeroallergens (mite, cat, dog, molds, birch pollen, grass pollen, mugwort pollen, and latex) was found. The intra-assay CV was 4.8% ($n=6$), and the inter-assay CV 21% ($n=12$).

Dust *F.b.* antigen levels under the plant. *F.b.* levels under the plant on uncarpeted floors (undetectable; $n=11$) were lower than on carpeted floors (mean: 4.7 AU/g; $n=20$) ($P<0.0001$).

***F.b.* antigen levels under the plant and away from it.** Concentrations of *F.b.* antigens in the dust of rugs or sofas located at 3 m from the plant were significantly higher (mean 0.246 AU/g) than the levels under the plant set on an uncarpeted floor (undetectable) ($P<0.05$). *F.b.* antigen levels were measurable in 5/11 mattress dust samples.