

lesions in the same limited areas after systemic administration of the offending drug are obscure. A case of FDE induced by tonic water is reported here.

In January 2002, a 23-year-old woman presented at our allergy unit reporting 4 episodes of skin rash characterized by multiple, pruritic, fixed skin lesions during the previous year. The patient said that the acute lesions had lasted approximately 4 to 5 days and responded quite well to local corticosteroids. At the clinical examination, nummular hyperpigmented lesions were visible on her upper lip, left arm (2 close lesions), neck, back, and right breast. The woman was otherwise well and had not taken any drugs during the previous year. All results of laboratory investigations (including a large panel of immunologic tests) were normal. An independent dermatologist confirmed the diagnosis of probable FDE. At the end of February, the patient presented for a follow-up visit; she reported a relapse of her skin lesions approximately 1 hour after drinking half a can (approximately 150 mL) of tonic water. Moreover, she noted that the previous episode had also been preceded by ingestion of the same kind of tonic water, which she had started to consume occasionally during the previous year. The label on the beverage can reported "flavours" and "quinine bichlorhydrate" among the ingredients. After 3 weeks, an open challenge test with 50 mL of the same brand of tonic water was performed at the allergy center. Informed written consent was obtained before the procedure was begun.

We planned to keep the patient under observation at the center for 2 hours after administration of the beverage. After 90 minutes, clear-cut erythema and edema appeared at the usual sites. Intolerance to tonic water was diagnosed. To exclude other possible causes for the skin lesions, the patient was asked to avoid tonic water but to otherwise maintain her alimentary habits during the following 3 months.

At a mid-June follow-up visit, the patient reported that she had not had any further episodes of fixed eruption. A patch test with a 20% solution (both in water and alcohol) of quinine sulfate was tentatively carried out on both affected and normal skin. No reaction was observed at 48 hours or 72 hours. Finally, an open oral challenge with quinine sulfate was performed. (The patient gave an informed consent before this procedure was begun.) Approximately 40 minutes after the ingestion of 30 mg of the drug, pruritus, erythema, and edema appeared at the usual sites. Quinine hypersensitivity was diagnosed.

This is probably one of the first reports of a fixed eruption induced by a drug present in a food rather than by a drug taken by itself. In fact, the woman had never taken quinine before the challenge test. This suggests that the small concentration of quinine contained in the commercial tonic water had been sufficient to sensitize her and to induce all of the reported episodes of fixed eruption.

Although a photo patch test was not carried out, the negativity of patch tests with a quite high concentration of quinine (20%), both on affected and normal skin, in the presence of a rather rapid response on oral challenges (90 minutes with tonic water, 40 minutes with quinine 30 mg) raises some doubts about a delayed hypersensitivity reaction as a possible pathogenic mechanism of this kind of skin reaction. Quinine hypersensitivity reactions, including thrombocytopenia and hemolytic uremic syndrome,⁷ lupuslike syndrome,⁸ photosensitivity,⁹ cutaneous vasculitis,¹⁰ and anaphylactic shock,¹¹ have been described, and IgE-mediated urticaria from quinine in tonic water has recently been reported.¹² Moreover, quinine was previously implicated in FDE.^{13,14} Our study shows that the quinine contained in commercial tonic water (and in other soft drinks, as well as in alcoholic beverages) might elicit FDE as well.

Riccardo Asero, MD
Ambulatorio di Allergologia
Ospedale Caduti Bollatesi
Bollate (MI)
Italy

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Risk factor for latex allergy in 54 children with atopy and latex sensitization

To the Editor:

Atopic children are at low risk (3%) of latex sensitization (presence of cutaneous IgE, serum latex-specific IgE, or both),¹ although according to Liebke et al,² the prevalence of latex sensitization in atopic children is much higher (20.8%). Some atopic children with latex sensitization might present symptoms to latex, whereas others have no clinical reactions after exposure to products containing latex proteins.

The aim of our study was to determine the risk factors associated with latex allergy in children with atopy and latex sensitization, excluding subjects affected with spina bifida (considered at high risk of latex sensitization).³

Fifty-four children with atopy and latex sensitization were studied. Thirty-three patients with latex allergy were referred to our allergy clinic because of clinical reactions to rubber. Twenty-one patients with only IgE to latex and without symptoms to latex were enrolled on the basis of latex skin prick tests (SPTs) and determination of specific serum IgE to latex that were done to 835 consecutive children referred to our allergy clinic for an allergic evalua-

TABLE I. Statistical comparison of variables in 54 children with atopy and latex sensitization among 33 children with symptoms to latex and 21 children without symptoms to latex

	Subjects with symptoms to latex (n = 33)	Subjects without symptoms to latex (n = 21)	Statistics
Sex			
Female	12 (36.4%)	3 (14%)	χ^2 , $P = .146$
Male	21 (63.6%)	18 (85.7%)	
Mean $\pm$ SD age (y)	9.772 $\pm$ 7.555	7.892 $\pm$ 2.702	Student t test, $P = .279$
Mean $\pm$ SD operations (no.)	1.724 $\pm$ 2.297	0.368 $\pm$ 0.597	Student t test, $P = .016$
IgE to latex >0.35 kUA/L, CAP system (kU/L)	31/31 (100%)	13/20 (65%)	Fisher exact test, $P = .00070$
IgE to latex $\geq$ 2+ (SPT)	30/32 (94%)	13/21 (62%)	Fisher exact test, $P = .009$
$\geq$ 2 Operations	12/31 (39%)	1/19 (0.5%)	Fisher exact test, $P = .009$
Positive prick-plus-prick response to $\geq$ 1 fresh foods*	29/31 (93%)	15/19 (79%)	Fisher exact test, $P = .184$

*Positive prick-plus-prick response to each food (number of children with positive skin test result/number of absolute of children): passion fruit (9/10 [90%]), avocado (24/34 [71%]), sweet pepper (17/25 [68%]), kiwi (34/51 [67%]), carrot (22/33 [67%]), dill (18/28 [64%]), potato (21/35 [60%]), banana (27/46 [59%]), peach (18/31 [58%]), mango (11/19 [58%]), chestnut (22/40 [55%]), fig (12/23 [52%]), pineapple (21/43 [49%]), sage (9/25 [36%]), buckwheat (4/16 [25%]), tomato (10/52 [19%]), and oregano (3/22 [14%]). Different denominators indicate lack of information for some patients.

tion. The parents of all patients answered a questionnaire (under the supervision of an allergist) revealing any current or previous presence of IgE-mediated diseases, clinical reactions to rubber, and the number and dates of previous operations. The latex SPT was carried out with a commercial extract (Lofarma spa, Milan, Italy), as previously reported.⁴ SPTs for common aeroallergens and food allergens⁴ were also performed by using commercial extracts (Lofarma spa). Skin tests with fresh food were done by using the prick-plus-prick technique with the following foods: kiwi, banana, pineapple, avocado, peach, passion fruit, mango, chestnut, potato, buckwheat, dill, fig, carrot, sweet-pepper, tomato, oregano, and sage. Skin tests were performed and interpreted according to the European Academy of Allergy and Clinical Immunology guidelines.⁵ The average diameter of each wheal was established by measuring the longest diameter and the diameter perpendicular to it. A score of 2+ was an average diameter half that of the wheal induced by 10 mg/mL histamine, 3+ was an average diameter equal to the wheal induced by 10 mg/mL histamine, and 4+ was an average diameter double to the wheal induced by 10 mg/mL histamine. Only wheal responses of 2+ or greater were considered positive. Specific serum IgE to latex (RAST CAP System; Pharmacia, Uppsala, Sweden) were determined according to the manufacturer's instructions, and the reference values for RAST CAP were provided by the manufacturer (a result of >0.35 kUA/L was considered positive). For statistical analysis, the χ^2 test, the Fisher exact test, and the Student t test were used. P values of less than .05 were considered significant. All data were analyzed with a commercial statistical package (SASS for Windows; SASS, Chicago, Ill).

Table I summarizes the results of statistical comparison of various variables in the children studied. In children with atopy and latex sensitization, statistical analysis showed a significant association between symptoms to latex and (1) the presence of specific IgE to latex of greater than 0.35 kUA/L ($P = .00070$), (2) the presence of an increased number of surgical operations ($P = .016$), and (3) the presence of a latex SPT result of 2+ or greater ($P = .009$), whereas there was no significant association between symptoms to latex and the other variables studied.

In conclusion, this study revealed that in children with atopy and

latex sensitization, a positive latex SPT result ($\geq$ 2+) and a RAST CAP result to latex of greater than 0.35 kUA/L were associated with the appearance of latex symptoms. Moreover, having had 2 or more surgical operations was a high risk factor for symptoms to latex.

Roberto Bernardini, MD^a

Elio Novembre, MD^a

Enrico Lombardi, MD^a

Neri Pucci, MD^a

Maria Grazia Monaco, MD^a

Alberto Vierucci, MD^a

Francesco Marcucci, MD^b

^aPediatric Allergy and Pulmonology Center

Anna Meyer Children's Hospital

Via Luca Giordano 13

50132, Florence, Italy

^bDepartment of Pediatrics

University of Florence

Department of Pediatrics

University of Perugia

Italy

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