

Delayed-type natural rubber latex allergy not accompanied by immediate-type

MARIKO SUGIURA, RITSUKO HAYAKAWA, YOSHIMI KATO, KEIJI SUGIURA, RIKA HASHIMOTO AND HIROSHI OGAWA

Department of Environmental Dermatology, Nagoya University School of Medicine, 1-1-20 Daikominami, Higashi-ku, Nagoya 461-0047, Japan

Key words: allergic contact dermatitis; hand eczema; natural rubber latex; delayed-type; patch testing. © Munksgaard, 2000.

There were no reports concerning immediate-type natural rubber latex (NRL) allergy until the 1970s (1). From the 1980s, many such reports were published. The 1st Japanese case report of contact urticaria from NRL was in 1993, since when many further cases have been reported in Japan (3–15), mainly of the immediate-type.

Patients and Methods

Case no. 1

A 39-year-old housewife with a past history of allergic rhinitis and metal allergy had had hand dermatitis since 1990. That same year, she had used rubber gloves to protect her hands. She had been treated for her dermatitis with topical and systemic corticosteroids, but her symptoms had persisted.

Case no. 2

A 36-year-old male hairdresser with no relevant past history, had had hand dermatitis since June 1999. He had used rubber gloves to protect his hands while working since December 1999. He had treated his dermatitis with topical and systemic corticosteroids, but his symptoms remained.

Specific IgE

We used the method of Pharmacia CAP-RAST (Pharmacia & Upjohn, Tokyo, Japan) and Alastat (SRL, Inc., Tokyo, Japan). We examined specific IgE for latex, banana and avocado using Pharmacia CAP-RAST system and specific IgE for chestnut using the Alastat system.

Prick testing

For prick testing, we incubated 1 g of latex gloves supplied by the patients, 1 g Baxter Triflex (Tokyo, Japan) and 1 g ammoniated latex sheet (Pacific Dunlop Japan K.K., Tokyo, Japan) in 5 ml of saline. We also incubated 1 g of banana, 1 g of avocado and 1 g of chestnut in 10 ml of saline. After 30 min, latex sheet, latex gloves and foods were removed and filtered through sterilized papers. The solutions were stored in sterile bottles and used for scratch testing. We used saline (Otsuka Pharmaceutical Co, Ltd, Tokyo, Japan) as a negative control and 10 mg of histamine chloride (Wako Pure Chemical Industries, Ltd., Osaka, Japan) in 1 ml of saline as a positive control.

Using Prick-Lancetter (1 mm) with shoulders to prevent deeper penetration, we carried out prick tests with test solutions. Readings were made at 20 min after placing samples according to Lahti (16): – = not reacted; 2+ = 1/2 histamine solution's reaction-sized erythema

and 1/2 histamine solution's reaction-sized edema; 3+ = histamine solution's reaction-sized erythema and histamine solution's reaction-sized edema; 4+ = erythema and edema stronger than the histamine solution's reaction.

Patch testing

We carried out 2-day (D) closed patch testing with latex gloves supplied by the patients as is, ammoniated latex sheet as is, thiuram mix (Japanese Society for Contact Dermatitis; JSCD), PPD black rubber mix (JSCD), mercapto mix (JSCD), dithiocarbamate mix (JSCD) (17), saline (negative control) and petrolatum (negative control), according to ICDRG recommendations.

Results

The results of specific IgE, prick testing and patch testing are shown in Table 1.

IgE RAST

Case nos. 1 and 2 were both negative for specific IgE to latex, banana, avocado and chestnut.

Prick testing

Case nos. 1 and 2 were both negative to all materials on prick testing.

Table 1. Results of investigations in case nos. 1 and 2

Latex IgE RAST	Case no. 1		Case no. 2	
	<0.35 UA/ml		<0.35 UA/ml	
prick testing				
extract of patient's latex gloves	–		–	
Baxter Triflex extract	–		–	
ammoniated latex sheet extract	–		–	
patch testing	D2	D3	D2	D3
patient's latex gloves	+	+	+	+
ammoniated latex sheet	+	+	+	+

Table 2. Patch testing with ammoniated latex sheet in controls

	D2	D3
–	36	40
?+	3	0
+	1	0
++	0	0
total	40	40
%≥?+	10.0	0.0
%≥+	2.5	0.0

Patch testing

Case nos. 1 and 2 both reacted positively (D2/D3 +/+) to the latex gloves supplied by the patients and ammoniated latex sheet, and negatively to thiuram mix, PPD black rubber mix, mercapto mix and dithiocarbamate mix.

We conducted control patch testing in 40 subjects using ammoniated latex sheet as is. We read: - 36 cases; ?+ 3 cases; + 1 case at D2; - all 40 cases at D3 (Table 2).

Discussion

Several previous reports have described delayed-type latex allergy (18-23), though few unaccompanied by immediate-type, and none such from Japan (13-15). Ammoniated latex sheet proved to be a detector of delayed-type NRL allergy on patch testing, with no false-positive reactions by D3.

References

1. Nutter A F. Contact urticaria to rubber. *Br J Dermatol* 1979; 101: 597-598.
2. Shono M, Maruyama R. Contact urticaria from rubber gloves. *Jpn J Dermatol Allergy* 1993; 1: 37-43.
3. Mizuashi K, Ono T. 13 cases of contact urticaria due to rubber gloves. *Japanese Journal of Latex Allergy* 1997; 1: 21-28.
4. Osuna H, Nishida R, Okajima M et al. A case of latex allergy with sensitizer of many foods. *Japanese Journal of Latex Allergy* 1997; 1: 29-35.
5. Akasawa N. Foundation and clinic of latex allergy. *Japanese Journal of Latex Allergy* 1997; 1: 2-9.
6. Takamasu T, Kurihara K, Goto K et al. 2 cases of anaphylaxis due to rubber routes. *Japanese Journal of Latex Allergy* 1997; 1: 19-22.
7. Morita Y, Urisu A, Tokuda R et al. A case of latex allergy with severe atopic dermatitis. *Japanese Journal of Latex Allergy* 1997; 1: 23-26.
8. Tanaka S, Hayakawa R, Sugiura M et al. A case of contact urticaria due to latex. *Environ Dermatol* 1997; 4: 225-230.
9. Toriyama H, Yamaguchi T, Fujita Y et al. A case of latex allergy with anaphylaxis due to banana. *Japanese Journal of Latex Allergy* 1997; 1: 40-45.
10. Tubaki T, Numata T, Nagayama Y et al. A case of anaphylaxis due to latex to be doubtful of interesting route of sensitization. *Japanese Journal of Latex Allergy* 1997; 1: 46-48.
11. Akita H, Matsunaga K, Tomitaka A et al. Investigation of latex allergy in Fujita Health University Hospital. *Japanese Journal of Latex Allergy* 1997; 1: 49-56.
12. Tomita S, Sugawara K, Tamakawa S et al. Intraoperative anaphylaxis caused by latex surgical gloves. *Anesthesia* 1998; 47: 213-216.
13. Hayakawa R, Sugiura M, Tanaka S et al. Group study on latex allergy. *Environ Dermatol* 1999; 6: 10-16.
14. Sugiura M, Hayakawa R, Kato Y et al. 5 cases of latex allergy. *Environ Dermatol* 1999; 6: 153-160.
15. Tanaka S, Nitta Y, Matsumoto Y. Coexistence of immediate and delayed-type allergy to natural rubber latex. *Contact Dermatitis* 2000; 42: 177-178.
16. Lahti A, Turjanmaa K. Prick and use tests with 6 glove brands in patients with immediate allergy to rubber proteins. *Contact Dermatitis* 1992; 26: 259-262.
17. Miyoshi H, Research Group of the Japanese Society for Contact Dermatitis. Large-scale patch-testing with Japanese standard series, gold sodium thiosulfate, thimerosal, and mercuric chloride, and the number of new patients with pigmented contact dermatitis in 1994. *Environ Dermatol* 1997; 4: 95-103.
18. Wyss M, Elsner P, Wüthrich B, Burg G. Allergic contact dermatitis from natural latex without contact urticaria. *Contact Dermatitis* 1993; 28: 154-156.
19. Van der Walle H B, Brunsveld V M. Latex allergy among hairdressers. *Contact Dermatitis* 1995; 32: 177-178.
20. Häffner A C, Zepter K, Elsner P, Burg G. Isolated delayed-type hypersensitivity to latex rubber. *Contact Dermatitis* 1996; 35: 247-248.
21. Wilkinson S M, Beck M H. Allergic contact dermatitis from latex rubber. *Br J Dermatol* 1996; 134: 910-914.
22. Wilkinson S M, Burd R. Latex: a cause of allergic contact eczema in users of natural rubber gloves. *J Am Acad Dermatol* 1998; 39: 36-42.
23. Shaffrali F C G, Gawkrödger D J. Allergic contact dermatitis from natural rubber latex without immediate hypersensitivity. *Contact Dermatitis* 1999; 40: 325-326.