

Prick and use tests with 6 glove brands in patients with immediate allergy to rubber proteins

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20 patients with contact urticaria from rubber gloves were prick tested using eluates from 4 latex (Triflex[®], Ansell Gammex, Exona, Armi) and 2 non-latex (Tactylon[™], Elastyren[®]) glove brands. All patients showed a positive prick test reaction to at least 2 latex glove eluates. A hypoallergenic glove (Ansell Gammex) gave a positive prick test reaction in 1 patient, but non-latex gloves were negative in all cases. All patients showed a positive result in the use test with a latex surgical glove (Triflex[®]), whereas none did with a non-latex glove (Tactylon[™]). Non-latex gloves and, in some cases, also hypoallergenic latex gloves, are a good alternative to rubber gloves for patients with immediate latex allergy.

Key words: contact urticaria; prick tests; use tests; rubber latex; rubber gloves; Elastyren[®]; Tactylon[™]; non-latex gloves; thermoplastic elastomers; prevention.

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IgE-mediated allergy to proteins in latex presents a health hazard both to patients and personnel at hospitals, and to ordinary consumers in the household. The most common items eliciting immediate immunologic contact reactions to rubber are surgical and household gloves, and condoms (1, 2). The strength of the reactions varies from local itching and wheals to generalized anaphylactic symptoms. Because the term 'hypoallergenic' can be misleading with reference to gloves and because a new non-latex glove material has appeared on the market, 4 different latex gloves and 2 non-latex gloves were tested using skin prick tests and use tests in patients allergic to rubber proteins.

Patients and Methods

The test subjects, 15 women and 5 men, mean age 34 (19-46) years, with previously diag-

nosed immediate allergy to rubber gloves (latex contact urticaria, prick test and use test positive) were prick tested again with eluates from 4 latex and 2 non-latex glove brands, and use tests were performed using a latex and a non-latex glove. Half of the patients (1-10) were tested at the University of Tampere and half (11-20) at the University of Oulu, Finland, during April and May, 1991. 6 of the patients from Tampere and 8 of those from Oulu were employed in a medical profession. Informed consent was obtained from all the test subjects.

Glove brands

The following gloves were used: Triflex[®] (Baxter Healthcare Co., Valencia, California, U.S.A.) (sterile surgeon's glove), Ansell Gammex (Ansell Rubber Co. Ltd., Malacca, Malaysia) (hypoallergenic latex surgical glove), Exona (Semperit, Vienna, Austria) (sterile

examination glove), Armi (Vascongada de Gaucho y Latex, Spain) (household glove), Tactylon™ (Tactyl Technologies Inc., Vista, California, USA) (non-latex sterile surgical glove) and Elastyren® (Danpren Gloves A/S, Albertslund, Denmark) (non-latex surgical glove).

Prick test materials

The test material was prepared from the gloves at the Department of Dermatology, University Hospital of Tampere. 20 pieces (1 × 1 cm) were cut from each glove and eluted for 30 min in 5 ml of sterile physiological saline stored in a plastic container (Baxter, Baxter Healthcare S.A., Castlebar, Ireland). The eluate was used fresh for prick testing or stored free of preservatives at 4°C (3). A new test solution was prepared every month. Histamine dihydrochloride 10 mg/ml in physiological saline was used as the positive reference, and physiological saline as the negative one.

Prick test

The prick tests were performed with the eluates and the references on the volar forearm. A drop of test solution and the epidermis beneath were pierced with a prick lancette (Dome Hollister Stier, Needle Industries Group Ltd., Studley, Warwickshire, England) and the rest of the solution was gently wiped off with blotting paper. Wheal reactions were measured 15 min after application in 2 maximal perpendicular directions (D+d, mm) and divided by 2. The reaction was considered positive if it was at least 1/2 the figure for the histamine reaction.

Use test

Tactylon™ was selected for the use test because it is the newest glove material to be introduced for latex-allergic patients and because its properties were the main interest of this study. Triflex® was selected to represent a widely used sterile latex glove which is known to elicit strong reactions in latex-allergic patients (3).

The use test was performed on wet hands.

The Tactylon™ non-latex glove was challenged on the whole hand for 30 min. The Triflex® latex glove was first exposed to one finger for 15 min. If the reaction was negative, a whole glove exposure was carried out for 15 min, or less if intense itching occurred. A wheal reaction was counted as a positive reaction.

Results

All patients showed positive prick test reaction to 2 of the latex gloves, Triflex® and Armi, and all but one to the Exona, but no positive reactions were elicited by the Tactylon™, the Elastyren®, or the physiological saline (Table 1). The hypoallergenic Ansell Gammex latex glove produced a positive reaction in 1 patient.

The use tests were all positive with a Triflex® glove but negative with a Tactylon™ glove. The finger test was positive in 8 patients from Tampere and in 5 patients from Oulu. The whole glove test was required for 7 patients.

Discussion

It has been shown that 3% of hospital personnel show an immediate allergic reaction to latex gloves (4). Different brands of gloves contain different amounts of latex protein antigen and, hence, the risk factor for immediate contact reactions and contact urticaria varies in each case (3).

The most reliable test for confirming suspected latex contact urticaria is the use test with highly allergenic rubber gloves. In a previous study, 12 out of 13 latex-allergic patients produced a positive use test result in 15 min, and the 13th patient took 4 hours to develop wheals (5). In the use test, patients may develop systemic symptoms if the allergy is strong, and therefore the finger challenge must be performed first (6). The results of this study were in accordance with earlier studies, and showed that the use test is a reproducible and reliable test for confirming latex contact urticaria.

Prick tests must be carried out using ex

Table 1. Prick (mean of $D+d$ (mm)) and use test results with 6 glove brands in latex-allergic patients. Abbreviations: HI = Histamine dihydrochloride 10 mg/ml; TR = Triflex[®]; EX = Exona; AR = Armi; AG = Ansell Gammex; TA = Tactylon[™]; EL = Elastyren[®]; NC = NaCl physiol.; FI = finger; HA = hand

Patient no.	Prick test								Use test		
	HI	TR	EX	AR	AG	TA	EL	NC	TR		TA
									FI	HA	HA
1.	5	7	8	10	0	1	0	0	+		—
2.	8	9	5	6	2	0	0	0	+		—
3.	5	5	2	3	0	0	0	0	+		—
4.	5	8	5	6	1	1	0	0	—	+	—
5.	7	7	5	6	0	0	0	0	+		—
6.	4	2	2	3	0	0	0	0	+		—
7.	6	6	4	7	0	0	0	0	+		—
8.	5	10	8	10	1	0	0	0	+		—
9.	6	8	6	6	0	0	0	0	—	+	—
10.	4	4	3	4	0	0	0	0	+		—
11.	5	4	4	6	0	0	0	0	—	+	—
12.	5	7	6	6	0	0	0	0	—	+	—
13.	4	4	4	4	0	0	0	0	—	+	—
14.	5	5	5	4	0	0	0	0	+		—
15.	5	8	11	6	0	0	0	0	—	+	—
16.	5	6	5	9	3	0	0	0	—	+	—
17.	4	4	3	4	0	0	0	0	+		—
18.	5	6	5	7	0	0	0	1	+		—
19.	4	6	5	5	0	1	0	0	+		—
20.	5	6	5	7	0	0	0	0	+		—

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tempore allergen solutions made from latex gloves or pieces of latex. As yet, there is no commercially available prick test material of corresponding sensitivity and specificity. A radioallergosorbent test (RAST) for latex is commercially available (Pharmacia Diagnostics, Uppsala, Sweden) but it detects only about 65% of latex-allergic patients (5).

In the present study, the Ansell Gammex glove elicited a positive prick test result in only 1 patient, which confirms an earlier finding that Ansell Gammex gloves do not elicit positive prick test reactions in latex-allergic patients as often as Triflex[®] and similar types of latex gloves do (3). The manufacturer of this glove brand has succeeded in reducing the amount of antigenic protein in the glove material. Ansell-Gammex-type gloves probably reduce or delay sensitization, but if the latex allergy already exists and is severe, few patients can tolerate anything other than non-latex gloves. According to Fisher, the term 'hypoal-

lergenic' refers to glove material in which the amount of rubber chemicals is reduced and replaced by less sensitizing ones (7). Thus, the term 'hypoallergenic' says nothing about the protein content or the immediate allergenicity of the latex material.

The Tactylon[™] and Elastyren[®] non-latex gloves both belong to the general category of thermoplastic elastomers. They are also referred to as block copolymers. Tactylon[™] is polystyrene-poly(ethylene-butylene)-polystyrene and Elastyren[®] is polystyrene-polybutadiene-polystyrene. The saturated midblock of Tactylon[™] polymer increases the chemical stability of the compound. Neither the Tactylon[™] nor Elastyren[®] glove elicited immediate allergic reactions in this study or in an earlier study (3). They are a good alternative for latex-allergic patients doing sterile work. Household gloves and condoms are also made of Tactylon[™].

Eliminating allergenic proteins from the lat-

ex sap or during the manufacturing process is the challenge of the future. International quality standards for rubber should also specify the protein content of the material. This cannot be achieved before we develop reliable methods for measuring protein allergens in rubber.

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