

Condoms as a source of latex allergen and cause of contact urticaria

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To examine the occurrence of latex allergen in condoms and to study the symptoms caused by contact with condoms, 46 patients with latex-glove contact urticaria (LGCU) were investigated. 7 (24%) of the 29 patients with a history of condom use had experienced local swelling and/or pruritus during intercourse, confirming that condoms can cause local symptoms in latex allergic subjects. Prick tests performed on 16 different condom brands showed that 4 brands caused positive reactions in 52-67% of patients. The remaining 12 brands were not as allergenic and 1 brand was totally negative on prick testing. 1 highly allergenic condom brand was examined by high-pressure liquid chromatography (HPLC), which showed similar protein profiles to those detectable in latex gloves and natural rubber. These results show that, in addition to rubber gloves and balloons, condoms should also be considered as possible sources of latex, and that patients with LGCU should be advised to avoid condoms.

Key words: rubber latex; contraceptives; condoms; type I hypersensitivity; prick testing; contact urticaria.

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Various surgical and cleaning gloves are made from natural rubber latex and the proteins eluting from these gloves can sensitize atopic persons and cause contact urticaria (1). The systemic symptoms include generalized urticaria, facial edema and even asthmatic attacks and anaphylactic reactions. Using high-pressure liquid chromatography (HPLC), we have previously shown that both surgical and cleaning gloves contain similar allergenic proteins to natural rubber latex (2). Balloons and condoms are also made from rubber latex and Axelsson et al. (3) previously described 3 children who developed either angioedema or anaphylactic reactions from contact with rubber balloons.

In the present study, we examined 16 different condom brands to find out if they released latex allergen or caused contact urticaria symptoms in sensitized people. 46 patients with latex-glove contact urticaria (LGCU)

were questioned for symptoms and prick tested with allergens eluting from the different condoms. Proteins from one condom brand were analyzed by HPLC.

Patients and Methods

46 patients with LGCU, sensitized either from surgical or cleaning gloves, were examined. Their mean age was 36 years (range 19-60 years), 41 were female and 5 male, and all were diagnosed by using the latex-glove prick test previously described (4). The patients were personally questioned about use of condoms and whether they had experienced any adverse symptoms during or after intercourse.

A series of 16 different condom brands marketed in Finland were used for prick tests. All condom brands were imported. 3 of them originated from one US manufacturer (Ansell Inc., Dothan, ALA); 8 from Japan (Sagami

Table 1. Laboratory results in 7 latex allergic patients with symptoms from condoms

Patients no./sex/age	Symptoms	Prick tests		Latex RAST (PRU/ml)	Total IgE (kU/l)
		with 1 condom brand* (grade)	with latex glove (grade)		
1/F/34	swelling, pruritus	3+	3+	1.8	22
2/F/28	swelling, pruritus	3+	4+	14.9	1216
3/F/41	swelling, pruritus	3+	4+	0	8
4/M/27	swelling, pruritus	2+	2+	1.8	36960
5/F/28	pruritus	2+	4+	44.4	3693
6/F/30	pruritus	3+	3+	6.4	1510
7/F/19	pruritus	2+	2+	0	7

* No. 1, Table 2.

Rubber, Ltd., Fujilatex Co. Ltd.; Yachiyo Inc. Ltd.); 4 from England (LR Industries Ltd.); and 1 from Switzerland (Lamprecht AG.). The condom prick test solution was prepared by incubating small pieces of condom in physiological saline at room temperature for 30 min, a procedure similar to that used for preparing test solutions for latex-glove allergen (4). Commercial latex RAST (k 82, Pharmacia Diagnostics, Uppsala, Sweden) was used to measure specific IgE-antibodies in patient sera, as previously described (4). The proteins in the

eluate from one condom brand were examined using HPLC, as previously described (2).

Results

29 of the 46 patients with LGCU had a history of condom use and 7 (24%) of these had experienced swelling and/or pruritus (Table 1). 2 of the 7 patients (nos. 1 and 2) had noticed that a particular condom brand caused the symptoms more readily and this brand was the same as the one found to be the most allergenic

Table 2. Prick test results for 16 different condoms in 46 patients with latex-glove contact urticaria

Condom brand no.	Patients sensitized from surgical gloves (n = 24) grade			Patients sensitized from cleaning gloves (n = 22) grade			All patients (n = 46) positive (%)
	4+*	3+	2+	4+	3+	2+	
1.	3	1	10	3	4	10	31 (67%)
2.	2	1	8	4	1	11	27 (59%)
3.	1	0	7	2	5	10	25 (54%)
4.	4	1	5	5	4	5	24 (52%)
5.	0	0	3	1	1	4	9 (20%)
6.	0	0	2	0	1	3	6 (13%)
8.	0	0	0	0	2	3	5 (11%)
8.	0	0	4	0	1	0	5 (11%)
9.	0	0	0	0	0	3	3 (7%)
10.	0	0	2	0	0	1	3 (7%)
11.	0	0	1	0	0	2	3 (7%)
12.	0	1	1	0	0	0	2 (4%)
13.	1	0	0	0	0	1	2 (4%)
14.	0	0	0	0	0	2	2 (4%)
15.	0	0	0	0	0	1	1 (2%)
16.	0	0	0	0	0	0	0 (0%)

* 4+ bigger, 3+ the same and 2+ half of that of histamine (10 mg/ml).

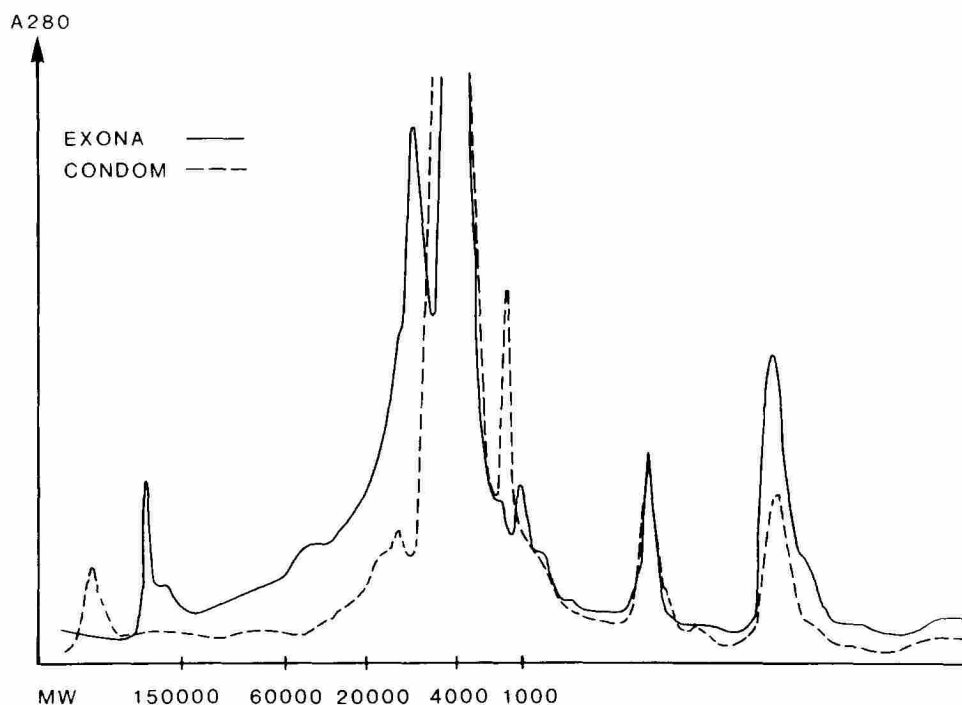


Fig. 1. High-pressure liquid chromatography (HPLC) analysis of 1 condom and 1 latex surgical glove (Exona) brand. The protein profiles are similar and 1 HPLC fraction (MW 3,000–10,000) of a condom eluate gave a 4+ prick test reaction in a latex allergic subject.

in prick tests. Of the 22 patients experiencing no symptoms from the condoms, there were 12 who used condoms only occasionally, but also 1 female patient who regularly used condoms but suffered no symptoms, although she was clearly allergic to latex (latex-glove prick test 3+, latex RAST 8.9 PRU/ml).

Prick test results for 16 different condom brands are shown in Table 2. 4 brands were clearly more allergenic and caused positive prick tests in 52% to 67% of the patients. In contrast, the frequency was much lower in other brands, being 20% or less. No major differences were found between those patients sensitized from using surgical gloves and those sensitized from using cleaning gloves (Table 2). In the 46 patients tested, there was only 1 who showed no positive reactions to condoms. The individual positive prick test reactions to condoms varied from 4+ to 2+. 13 (28%)

patients showed 4+ reactions to 1 or more condom brands: these 13 patients also had clearly positive latex-glove prick tests (8 had 4+ and 5 had 3+ reactions), and 10 of them had a positive latex RAST (3 had score 4, 6 score 3 and 1 score 2).

HPLC analysis of one highly allergenic condom brand (no. 1 Table 2) revealed similar protein fractions to those eluted from a latex glove (Fig. 1). 3 HPLC fractions were prick tested in 1 patient. 1 fraction (MW 3,000–10,000) gave 4+, and the remaining 2 gave 2+, prick test reactions.

Discussion

In the present study, we were able to show that patients with LGCU may also experience symptoms from contact with condoms. Of the 29 patients with a history of condom use, 7 (24%) had experienced local swelling and/or

pruritus from the condoms. 5 of the patients were females and 1 was male. The symptoms occurred on the genitals but no systemic symptoms were observed.

Recently, Wrangsjö et al. (5) also found, among 30 patients with latex allergy, 3 (10%) subjects who reported symptoms from contact with condoms. Latex allergic patients may even develop anaphylactic reactions, during deliveries and vaginal examinations, from the latex gloves worn by doctors (5, 6).

That no such severe reactions were encountered among the present patients might be due to differences in mucosal contact with condoms during intercourse or due to the smaller quantity of latex allergen in condoms compared with that in surgical latex gloves.

We therefore performed prick tests with 16 condom brands in all 46 patients with LGCU and confirmed that differences existed between various brands. 4 brands were more allergenic and caused positive prick test reactions in over 50% of the patients, whereas the frequency was below 20% in the remaining 12 condom brands, and 1 brand was totally negative.

3 of the 4 most allergenic brands are used frequently in Finland and originate from the same manufacturer. Equally, the 2 condom brands (nos. 15 and 16, Table 2) causing only a few or no positive prick test reactions were made by the same manufacturer. This strongly suggests that the manufacturing process is important for the occurrence of latex allergen in condoms.

The manufacturing process is similar for condoms and surgical latex gloves and includes the dipping of the mold in liquid latex, containing additives such as antioxidants and dyes. However, differences may exist in the manufacturing process and this could be one reason for the higher allergenicity of certain condom brands observed in the present study and that of certain latex-glove brands observed in our previous study (2). Unfortunately, the exact methods used in the manufacture of condoms and latex gloves are industrial secrets and were not available to us.

The HPLC analysis of 1 highly allergenic condom brand showed similar protein profiles to that of the latex-glove brand examined. The most allergenic fraction had a MW from 3000 to 10,000 and similar proteins occur in natural rubber latex (2). These results confirm that the latex allergen in condoms is definitely derived from the natural rubber latex used in the manufacture of condoms.

The local symptoms from condoms in latex allergic patients may easily escape diagnosis. None of our 7 patients had made any connection between their vaginal or penile symptoms and their latex-glove allergy, even though 2 had noticed that one particular condom brand always caused symptoms. Vaginal pruritus and swelling is not infrequent after intercourse and may easily be misinterpreted as non-specific. However, such symptoms can be due either to IgE-mediated allergy to seminal fluid (7, 8) or, if a condom is used, to latex allergy as in the present study. When suspected, seminal fluid or latex contact urticaria can be confirmed by using the appropriate allergen in prick tests or RAST (4, 5, 7, 8). However, the latex RAST may more often be negative than prick and basophil histamine release tests in LGCU (9) and, in agreement with this, 2 of our 7 patients experiencing symptoms from contact with condoms had a negative latex RAST.

Patients with LGCU can have concomitant delayed allergy to rubber chemicals (2, 5) but all 7 of our patients had negative patch tests. However, delayed allergy from condoms has also been described in males using rubber condom urinals (10) and in 1 female with contact dermatitis from a spermicidal lubricant used on the condom (11).

In conclusion, the present study focuses on the fact that patients with LGCU may also experience symptoms from condoms and that this possibility should be taken into account when informing patients about items containing latex. The reason for the different allergenicities of various condom brands remains uncertain and the possibility that condoms may primarily sensitize persons to latex still needs to be confirmed.

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