

Condoms are not a risk factor for sensitization to latex

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Received 28 March 2002; received in revised form 30 July 2002; accepted 14 August 2002

Abstract

The study was conducted to assess the prevalence of sensitization to latex in a group of women with a high risk for atopy and to determine whether the use of condoms is a relevant risk factor. In a prospective study, 100 atopic women (defined as having specific IgE to common aero- or nutritional allergens) were screened for specific IgE antibodies to latex after delivery: Ten of the 100 women (10%) showed specific IgE to latex. Total IgE concentrations were higher with a history of occupational exposure or of symptoms after contact with latex ($p < 0.05$, and $p < 0.005$, respectively), but condom users were not significantly more frequent in the latex-positive group. Our results indicate that prior use of condoms does not appear to be a specific risk factor for sensitization to latex in post-partum women at high-risk for atopy. Latex-free condoms should only be recommended to women already known to be sensitized to latex. © 2002 Elsevier Science Inc. All rights reserved.

Keywords: Allergy; Atopy; Condoms; Latex; Obstetrics; Risk factor; Sensitization

1. Introduction

Allergy to natural rubber latex has become a major health concern over recent years. Anaphylactic reactions in obstetric patients have been observed after vaginal examination [1], after vaginal delivery [2], after cesarean section [3–5], and during suturing of an episiotomy [6]. Latex reactivity can be suspected to be a result of cumulative cutaneous, mucous and absorptive membrane or inhalation exposure, so that first contact to latex and development of specific IgE precede the occurrence of allergic symptoms. With repeated exposure, allergy to latex can worsen or become life threatening. The highest prevalence of sensitization and allergy to latex has been found among patients with spina bifida [7].

In a previous study we assessed the prevalence of latex sensitization among a general female population (pregnant women admitted for delivery) and found atopy, and a history of cesarean section as risk factors for sensitization to latex with a prevalence of about 3% [7]. In this investigation, all latex-sensitized women were atopic as defined by the proof of specific IgE to common aero- or nutritional

allergens [7]. The use of condoms was more frequent in the group of latex-positive women; however, it failed to reach statistical significance.

If products containing latex come into contact with mucous membranes or with blood circulation during sexual intercourse, this may permit the rapid introduction of relevant amounts of antigen to mast cells and circulating basophils. Levy et al. [8] also found that 84% (79/94) of patients with latex allergy reported symptoms from contact with condoms. Furthermore, there are reports of allergic reactions of workers in the condom industry [9], particularly because allergenic proteins in latex condoms have been identified more specifically [10].

The objective of this prospective study was to determine whether the use of condoms would be a definite risk factor for sensitization to latex. For this reason, we did not choose the general population, but a group of women in puerperium with a high risk for atopy.

2. Methods

More than 300 women whose patients' charts were indicative for atopy were asked 10 to 48 h after delivery about allergic diseases (such as bronchial asthma, allergic rhinoconjunctivitis, or atopic dermatitis). There were 150 women

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Table 1
Condom use and latex sensitization

Cumulative condom use	Latex-negative	Latex-positive
0	25 (28%)	1 (10%)
1–10	19 (21%)	2 (20%)
10–50	16 (18%)	3 (30%)
50–100	9 (10%)	1 (10%)
>100	21 (23%)	3 (30%)
Σ	90 (100%)	10 (100%)

included by history, 3 women had to be excluded because of loss of questionnaire or blood sample, 47 by negative allergy tests. The final inclusion criteria of the remaining 100 women was atopy, defined as showing positive SX1 or fx5 (>0.35 kU/liter).

One-hundred women who tested positive for atopy were screened for specific latex IgE after delivery. Their ages ranged from 18 to 42 years (median 30 years). A questionnaire was completed by the women in the presence of a physician that included questions about known atopic history, the obstetrical and surgical history, any occupational long-term contact with latex or previous contact with latex in the daily environment, any previous use of condoms and any symptoms after contact with latex. A condom user was defined as having used at least one condom ever. Venous blood was collected from the cubital vein of all women during regular full blood count control within 48 h after delivery. The local ethics committee approved, and informed consent was obtained from each woman before questioning and blood acquisition.

Total IgE and specific IgE to latex were determined from sera by solid-phase immunoassay (FEIA); Pharmacia CAP-system (PCS) (Pharmacia Upjohn, Uppsala, Sweden) [11]. To establish atopic status, inhalant (SX1), and nutritional (fx5) allergens were investigated by screening tests using the same automated IgE assay [12]. SX1 contains the allergens of timothy, birch, mugwort, house-dust mite, cat, dog, and *Cladosporium herbarum*. The allergen fx5 contains milk, egg, fish, soy, wheat, and peanut. None of these allergens is known to cross-react with latex.

For statistical analysis, the Mann-Whitney U-test was used for continuous variables, the chi-squared test for discrete variables, and Fisher's exact test. Significance was established at p-values below 0.05.

3. Results

Ten of the 100 subjects (10%) were found to be sensitized to latex with specific IgE concentrations ranging from 0.39 kU/liter to 43.8 kU/liter (median 1.8 kU/liter). Total IgE concentrations of median 458 (217–1029) kU/liter were higher in this latex-positive group versus 78 (41–147) kU/liter in the latex-negative group ($p < 0.001$).

The proportion of condom users was not significantly

Table 2
History of caesarean section or other major abdominal surgery and latex sensitization (chi-squared test, n.s.)

	Latex-negative		Latex-positive		Σ
No history of surgery	55	91.7%	5	8.3%	60
		61.1%		50%	
History of surgery	35	87.5%	5	12.5%	40
		38.9%		50%	
Σ		90		10	100

higher in the latex-positive group than in the negative group. In general, condom use was common (90% and 72%, respectively) with 30% (3/10) and 23% (21/90), respectively, having used condoms more than 100 times by their own estimation (Table 1). Furthermore, there was no correlation to the frequency of condom use (using a classification of five groups: no condom, 1 to 10, 11 to 50, 51 to 100, or >100 condoms).

Twelve out of 90 women in the latex-negative group (13.3%) had a history of caesarian section, whereas no woman in the latex-positive group had ever had a cesarean section. A history of major abdominal surgery (any laparotomy) including cesarean section was higher in the latex-positive group (50% vs. 39%), but not significantly so (Table 2). Neither the number of pregnancies or deliveries, nor the number of anesthesia or surgical interventions in the history had a significant correlation with latex sensitization.

Five of the 10 women in the latex-positive group reported a history of symptoms after contact with latex, either occupationally or while using condoms, compared with only 7/90 women without specific latex IgE (50% vs. 8%, $p < 0.005$, Table 3).

Six of the 10 women with positive IgE to latex had a history of occupational exposure to latex (e.g., medical staff, hairdresser), whereas only 18 women in the latex-negative group did so (60% vs. 20%, $p < 0.05$, Table 4).

4. Discussion

To assess the prevalence of sensitization to latex in women in more detail, we investigated a group of women with a high risk for atopy rather than the general population. The reasoning was that in previous studies almost all latex-sensitized individuals were found to be atopic [13,14] and

Table 3
Symptoms and latex sensitization (chi-squared test, $p < 0.005$)

	Latex-negative		Latex-positive		Σ
No symptoms	83	94.3%	5	5.7%	88
		92.2%		50%	
Symptoms	7	58.3%	5	41.7%	12
		7.8%		50%	
Σ		90		10	100

Table 4
Occupational exposure and latex sensitization (chi-squared test, $p < 0.05$)

	Latex-negative		Latex-positive		Σ
No occupational exposure	72	94.7%	4	5.3%	76
Occupational exposure	18	80%	6	40%	24
		75%		25%	
Σ		20%		60%	100
		90		10	

the use of condoms is a potential risk factor for becoming sensitized via mucous membranes of the vagina. Among 100 atopic pregnant women admitted for delivery, 10 (10%) were positive for specific IgE to latex. These results support our previous findings [7], showing that an atopic disposition seems to be a prerequisite for becoming sensitized to latex.

We chose post-partum women as a representative of the general female population. Atopic disposition does not seem to be influenced by pregnancy or parturition. However, the course of clinically manifest allergic disease may change in both directions: Toward improvement and worsening of symptoms.

The frequency of condom users was higher in the latex-positive group, but not significantly so. In our study population, condom use was common in both groups (90% and 72%, respectively) with 30% (3/10) and 23% (21/90), respectively, having used condoms more than 100 times in their lifetime by their own estimation. Nine out of 10 women who were sensitized to latex said they had had contact with condoms regularly before their pregnancy. Nevertheless, the use of condoms does not seem to be a significant risk factor for sensitization to latex.

Five of the 10 women positive for latex IgE reported a history of symptoms after contact with latex, either occupationally or while using condoms, whereas only 7/90 women without specific latex IgE had a history of symptoms (50% vs. 8%, $p < 0.005$). In other words, 5 out of 12 women (42%) with a history of “latex allergy” had already had specific latex IgE. Therefore, a history of symptoms after contact with latex is a risk factor for latex sensitization.

Repeated contact with latex proteins in gloves has been found to lead to latex sensitization. Six of the 10 women with positive latex IgE had a history of occupational exposure to latex (e.g., medical staff, hairdresser), compared to only 18 women in the latex-negative group (60% vs. 20%, $p < 0.05$). Therefore, 6 out of 24 women (20%) with a history of occupational exposure to latex were found to have specific latex IgE.

5. Conclusion

Our results indicate that prior use of condoms does not appear to be a specific risk factor for sensitization to latex in post-partum women at high risk for atopy. However, following procedure seems to be reasonable: (1) Women with known atopic status should be screened for sensitization to latex; (2) For prophylactic reasons, latex-free condoms should be recommended to women sensitized to latex; (3) Women who have already symptoms after latex exposure should be diagnosed for latex sensitization/clinically manifest allergy and offered latex-free condoms if suspicion is confirmed.

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