

CLINICAL STUDY

Latex-related allergy in hemodialysis patients

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Abstract

Background: Incidence of allergic reactions is increased in hemodialysis (HD) patients. However, the prevalence of latex allergy is not exactly known in HD patients. The aim of this present study is to determine the prevalence of latex allergy in HD patients. **Methods:** A total of 205 adult HD patients were included in the study. Questionnaires were completed during patient interviews, and their consents were provided. Latex prick test and latex specific IgE test (HY-TEC, K82) were performed. Mean age of the patients was 52 ± 14 (25–79) years, and 61% was male. Mean dialysis duration was 38 months, and 21% of them were diabetics. Only five patients had allergic complaints in their histories, and none of them had severe anaphylaxis history. Latex prick test was positive in two patients. Latex specific IgE test was positive in five patients. Overall latex sensitivity was defined as 3.4%. **Conclusion:** No increased prevalence in latex allergy was determined in HD patients. Latex allergy incidence may be increased in atopic HD patients. Therefore, the use of latex products should be avoided as much as possible especially in atopic HD patients.

Keywords

Allergy, atopic, chronic kidney disease, hemodialysis, latex

History

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Introduction

Latex is a material, which is obtained from the milky juice of caoutchouc tree (*Hevea brasiliensis*), and is widely used in manufacturing medical equipments.^{1,2} As latex use become frequent in the medical field, it caused manufacturers to increase their mass production of latex, which was not adequately purified from allergens. This has resulted in a progressive increase in the incidence of allergic reactions, and it became a health problem with increasing significance.^{2,3}

In 1927, latex was first shown to cause allergic reactions, which led to urticaria and larynx edema.⁴ Latex allergy may cause clinical symptoms starting from mild dermatitis to life threatening anaphylactic reactions. Clinical presentations of type 1 hypersensitivity reactions (IgE mediated) are urticaria, angioedema, rhinitis, conjunctivitis, bronchospasm and anaphylaxis.^{2,3,5} Contact dermatitis is encountered as a result of delayed type of hypersensitivity (type 4, T cell mediated) reaction.^{5,6}

Some groups have higher latex sensitivity rates than that of the general population. These high-risk groups are made up of healthcare personnel, children with spina bifida and urogenital abnormalities, individuals working in latex containing product manufacturing, and subjects with recurrent surgical intervention history.^{5,7} While latex allergy incidence in the general population is 1%–6%, it is observed in increasing rates

as 15%–20% in healthcare personnel; 4%–10% in dentists and 65% in children with congenital urogenital system abnormalities.^{1,8,9} Latex allergy can cause cross-reactions against various foods, and latex allergy incidence is increased in subjects with allergy against banana, avocado, kiwi, melon, mango, pineapple, peach and chestnut.^{9,10}

Incidence of latex exposure is markedly increased in hemodialysis (HD) patients, because they apply more frequently to hospitals, as well as interventions performed during dialysis. Moreover, they are also frequently exposed to potential allergens, like antiseptics, nickel, and local anesthetics. In the literature, there are limited studies as regards frequency of latex allergy in HD patients. Currently, number of dialysis patients increased day by day, and also these patients are increasingly exposed to allergens. The aim of this present study is to determine the prevalence of latex allergy in HD patients.

Materials and methods

In this present study, 205 prevalent patients who were on thrice-weekly conventional HD treatment at three HD centers and older than 18 years were included. The etiology of chronic kidney disease was diabetic nephropathy in 43, hypertensive renal disease in 40, chronic glomerulonephritis in 22, chronic pyelonephritis in 20, polycystic kidney disease in 21 and unknown in 59. Questionnaires were completed during patient interviews. A total of 12 questions were asked in the questionnaire. Ten questions were directed to define

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sociodemographic characteristics, like age, gender, education level, living place, presence of atopic disease in the family, allergic symptoms, initiation of allergy, duration of symptoms, factors alleviating symptoms and smoking. Two questions were the score for allergic rhinitis (SFAR)¹¹ and the international study of asthma and allergies in childhood (ISAAC)¹² screening questions. Latex containing materials were described in the applied questionnaire, and participants were requested to mark the materials, which caused development of allergic symptoms after any contact.

After volunteer consent forms for skin test and blood collection were filled up, latex specific IgE and latex prick tests were performed on patients. Patient serums were collected concomitantly with a prick test, and they were stored at -20 °C. Later on, a latex specific IgE test was studied with these serum samples. In the prick test, allergens were applied on the volar side of forearm by using a Stallerpointe. Histamine phosphate was used as the positive control, and glycerin saline was used as the negative control. Patients, who had indurations more than 3 mm of the negative control at the 20th minute of the skin test response, were accepted as positive responders. Patients, who had increased erythema and induration of 2/3 of diameter with histamine, were classified as two positive (++). In the latex specific IgE (HY-TEC, K82) test, values below 0.35 IU/mL were defined as negative; between 0.35 and 0.70 IU/mL were (+); between 0.70 and 3.5 IU/mL were (+++); between 3.5 and 17.5 IU/mL were accepted (++++); between 17.5 and 50 IU/mL were (+++++); and between 50 and 100 IU/mL were (+++++).

All patients gave informed consent, and all procedures performed throughout the study were in accordance with the ethical standards of the Helsinki Declaration of 1975 (and as revised in 1983).

Results

Mean age of the patients was 52 ± 14 (25–79) years, and 61% was male. Mean dialysis duration was 38 months, and 21% of them were diabetics. Only five patients had allergic complaints in their personal histories, and none of them had severe anaphylaxis history. The demographical data of all patients are listed in Table 1.

Latex prick test was positive in two patients (1%). Latex specific IgE test was detected as (+) in two patients, (++) in two patients and (++++) in one patient. However, latex prick tests of patients with positive latex specific IgE test were defined negative. Latex specific IgE test in patients with

positive latex prick test were defined negative. Test positivity was defined in a total of seven patients (3.4%). While latex specific IgE was positive in 2.4% of patients, the latex prick test was positive in 1% of patients. Although none of patients with positive test results reported any latex sensitivity, two of them had seasonal allergic rhinitis, two had sensitivity against foods and one had contact dermatitis.

Discussion

In our study, latex sensitivity was detected in 3.4% of patients. Latex sensitivity was not increased in HD patients when compared with the general population in the literature. However, latex sensitivity rate was higher in patients with a history of atopy.

In the early 1990s, increased awareness in significance of antiseptic conditions led to increased use of latex containing products, and also it caused increased number of cases with latex-related hypersensitivity reactions. Although there are different data related to latex allergy, latex hypersensitivity was reported up to 20% in the high-risk group of healthcare personnel.⁸ Similarly, increased latex hypersensitivity was reported in children with spina bifida and urogenital system abnormalities, and in patients with recurrent surgical intervention histories.⁹ Although latex exposure frequency has been increased in HD patients, there is still limited number of studies in the literature. Kalpaklıoğlu et al.¹³ reported in their study about latex hypersensitivity on 268 HD patients that the prick test was positive in 1.1% of patients (not used specific IgE test analysis), and there was no significant difference with the general population. Nettis et al.¹⁴ reported in their study that latex hypersensitivity incidence was 19.3% in HD patients, and emphasized that 3/4 of them had atopy, pruritus, dermatitis-like complaints. Despite this, latex hypersensitivity was detected very low in HD patients. Similarly, we detected the prick test positivity as 1%, and specific latex IgE positivity as 2.4% in our patients.

Although latex hypersensitivity is increased in populations with increased latex exposure (i.e., healthcare personnel, patient having frequent surgical interventions, children with spina bifida and urogenital system abnormalities), and there are studies in the literature claiming that allergic type reaction incidence is increased in HD patients.^{15,16} However, frequency of latex hypersensitivity has not increased in these populations. This status can be explained by different mechanisms. First, T-cell inhibition and B-cell lymphopenia in patients with chronic renal failure can cause decreased production of specific IgE production, and this may decrease the incidence of type 1 reaction.¹⁷ Second, although spontaneous histamine discharge and abnormal complement activation can be responsible for anaphylaxis, which is increased in HD patients in the literature, IgE-mediated reaction may not be responsible for them.^{15,16}

In recent years, allergy against various foods like banana, avocado, kiwi, peach and chestnut have been defined in the majority of subjects with latex allergy, and it is believed to be caused by cross-reacting allergens.^{9,10} Similarly, there are studies reporting that latex allergy risk is increased 5–25 folds in subjects with atopic organisms, and atopy is detected up to 65% in subjects with latex allergy.^{9,10,18,19}

Table 1. The demographic data and allergic results of study patients.

	Patients (n:205)
Age (years)	52 ± 14
Sex (M/F)	125/80
Duration of hemodialysis (months)	38
Smoker (%)	16
History of allergy	
– Food allergy (n)	2
– Allergic rhinoconjunctivitis (n)	2
– Allergic contact dermatitis (n)	1
Latex specific IgE % (n)	2.4 (5)
Latex prick test % (n)	1 (2)

Yılmaz et al. reported in their study that latex hypersensitivity was positive in 35% of atopic subjects, whereas 4% in healthy control group.²⁰ In our study, two of the test positive patients described allergic rhinitis-like complaints (28%), and two described hypersensitivity to various foods.

Our study had some limitations. First, there were a limited number of patients, and there was no control group. Second, different tests were not performed for evaluation of contact hypersensitivity.

In conclusion, we defined no increased prevalence in latex allergy in HD patients. Incidence of latex allergy might be increased in atopic HD patients. This condition should be considered carefully, and the use of latex products should be avoided as much as possible especially in atopic HD patients.

Declaration of interest

The authors declare no conflict of interest.

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