Latex Sensitization: A Special Risk for Peritonitis in Continuous Peritoneal Dialysis Patients?

Lateks Sensitizasyonu: Sürekli Periton Diyalizi Hastalarında Özel Bir Peritonit Riski Midir?

Sürekli Periton Diyalizi Hastaları ve Lateks Allerjisi / Continuous Peritoneal Dialysis Patients and Latex Sensitization

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Özet

Amaç: Sürekli periton diyalizi tedavisi alan (CAPD) son dönem böbrek yetmezliği hastaları (SDBY) doğal lastik lateks alerjisi (NLLA) için şüpheli bir risk grubu olabilirler, çünkü bu hasta grubu özellikle peritonit atakları döneminde, lateks içeren steril eldivenler, cerrahi-anestezik ekipmanlar ve kataterlere yoğun olarak maruz kalmaktadırlar. Bu çalışmamızda CAPD hastalarında lateks sensitizasyonu insidansını ortaya çıkarmayı ve NLLA nın peritonit atak sıklığı için özel bir risk faktörü olabileceğini araştırdık. Gereç ve Yöntem: Bu çalışmada 50 peritonit atağı öyküsü olan CAPD hastası, 30 hiç peritonit atağı öyküsü olmayan hasta ve 26 sağlıklı birey yer aldı. NLLA testi tüm hasta ve kontrol grubuna yapıldı. Allerji öyküsü ve fizik muayeneleri alerji ve göğüs hastalıkları uzmanı tarafından yapıldı. Tüm bireylere alerjik yatkınlığı belirlemeye yönelik solunum fonksiyon testi (SFT) ve cilt prick testi (CPT) yapıldı. Bulgular: Bütün gruplarda demografik bilgiler, alerjik sorgulamalar, CPT ve SFT sonuçları benzerdi (p>0.05, sırasıyla). Grup I ve grup II' de NLLA saptanmadı (p>0.05). Grup III'deki 3 kontrolde NLLA saptandı (11.5 %, p< 0.01). CAPD hastalarında lateks sensitizasyonu ve NLAA riski açısından anlamlı bir ilişki saptanmadı. Hastalarla kontrol grubu arasında NLLA açısından istatistiksel olarak anlamlı bir fark vardı. Tartışma: Bu çalışmada CAPD hastalarında NLLA saptanmadı. Sağlıklı kontrollerle karşılaştırıldığında CAPD hastalarında lateks-hipersensitivitesi için artmış bir risk saptanmadı.

Anahtar Kelimeler

Son Dönem Böbrek Yetmezliği; Lateks Allerjisi; Sürekli Ambulatuar Periton Diyalizi, Peritonit; İmmün Sistem

Abstract

Aim: End-stage renal disease patients (ESRD) on continuous ambulatory peritoneal dialysis (CAPD) therapy can be a suspected risk group for natural rubber latex allergy (NRLA) because of their intense exposure to latex through catheters, gloves and anesthetic equipment especially during peritonitis attacks. We aimed to determine the incidence of latex sensitization in CAPD patients and evaluate frequency of peritonitis attacks as a risk factor for NRLA. Material and Method: We studied 50 CAPD patients with peritonitis history, 30 patients without any peritonitis attacks and 26 healthy controls. NLLA test was made all patients and control group.A questionnaire-based history; and examinations was carried out by an allergist and a pulmonologist. Respiratory Function Tests (RFT), skin prick test (SPT) were done for each individuals in order to determine allergic tendency. Results: All of the groups were similar in terms of demographic data, questionnaire items, RFT results (p>0.05, respectively). No NRLA was present in group I and II (p>0.05). Only three persons in group III had NRLA (11.5%, p< 0.01). Statistical analysis disclosed no association between latex sensitization and accepted risk factor for NRLA in CAPD patients. There are statistical differences between patients and control groups for NRLA. Discussion: In this study, we did not find NRLA in CAPD patients. CAPD patients were not at risk for latex-hypersensitivity compared with healthy population.

Keywords

End-Stage Renal Disease; Latex Allergy; Continuous Ambulatory Peritoneal Dialysis; Peritonitis; Immune System

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Introduction

Continuous ambulatory peritoneal dialysis (CAPD) is a renal replacement therapy performed approximately 8% to 9% of end-stage renal disease (ESRD) patients. Peritonitis is the most important complication of CAPD and the overall incidence during 1980s and early 1990s was reported as 1.1-1.3 episodes per patient year [1].

Latex gloves have been used in the health care industry for over 100 years, especially in the last decade the use of latex gloves has increased. The common use of latex in household items also increases the possibility of sensitization of latex [2]. Natural rubber latex allergy (NRLA) has become an important occupational health concern, particularly among health-care workers. Although there is not any study related with this subject, patients treated with CAPD are thought be a suspected risk group for NRLA because of their intense exposure to latex catheters, gloves and equipments.

In this paper, we aimed to determine the incidence of NRLA in CAPD patients and evaluate frequency of latex sensitization as a risk factor for peritonitis attacks.

Material and Method

Eighty CAPD patients followed up in nephrology department of Baskent University Faculty of Medicine Hospital were enrolled into the study. The exclusion criteria were age <18 years, pregnancy, patients with severe cardiovascular disease, patients with unstable pulmonary disease or therapy with beta-blockers, steroids and antihistaminic drugs including topical ones. Twenty-six healthy persons were taken as control group. 2000-3000 ml dialysate solutions (Baxter), which contain 1.36, 2.27 or 3.86 % glucose, were infused to CAPD patients, those who had been using gloves and other rubber goods made from latex 4-5 times a day.

A questionnaire-based history was taken and an examinations were carried out by an allergist for atopic diseases (food allergy, hay fever, asthma, atopic eczema, and hand eczema), allergic contact dermatitis and presence of eczema at the site of abdominal access for CAPD, immediate-type hypersensitivity reactions associated with drugs, natural rubber latex (NRL) hypersensitivity.

Respiratory function test (RFT) and skin prick test (SPT) were done for each individuals in order to determine allergic tendency. Positive SPTs were defined according to internationally accepted guidelines [3]. Atopy was diagnosed if there was a history of any atopic disease (allergic rhinoconjunctivitis, asthma and atopic eczema) or at least one positive skin test reaction to grass pollen, house-dust mite or cat. Natural rubber latex sensitization was defined by SPT and a definite history of symptoms to NRL material. Peritonitis was diagnosed by standard clinical and laboratory criteria.

Statistical analysis

For statistical analyses, 13.0 SPSS for Windows (SPSS Inc., Chicago, IL, USA) was used. All the numerical variables were expressed as mean + SD (standard deviation).Chi-square test, Student's T test were used in analysing the differences between the groups. Kruskal Wallis, Mann Whitney U analysis were used for nonparametric variables to compare differences among groups where necessary. A p value <0.05 was considered significant.

Results

The study population consisted of total 106 persons (CAPD patients with peritonitis history (n=50): Group I, CAPD patients without any peritonitis attack (n=30): Group II, and healthy controls (n=26): Group III). Characteristics and ESRD etiologies of the patients were shown in Table 1. In Group I (24 male, 26 female) mean age was 38.5 10.8 years (min. 24 years, max. 57 years), median duration of CAPD was 45.5 31.3 months. In Group II (18 male, 12 female) mean age was 35.4 11.5 years (min 21 years, max 59 years), median duration of CAPD was 28.8 32.2 months. In Group III (14 male, 12 female) mean age was 35.7 9.9 years (min 22 years, max 51years). No relation was found between all groups on age, gender and body mass index (BMI) (p>0.05). All of the groups were similar in terms of demographic data, questionnaire items and RFT results (p>0.05, respectively). In Group I and II none of the patients showed NRLA and SPT sensitivity (p>0.05), in Group III 3 persons showed NRLA and SPT sensitivity (11.5%, p<0.01). Statistical analysis disclosed no association between latex sensitization and accepted risk factor for NRLA in patients.

Table 1. Characteristics and ESRD etiologies of the patients

	Group I (n=50)	GroupII (n=30)	Group III (n=26)	p value
Mean age (year)	38.5 10.8	35.4 11.5	35.7 9.9	>0.05
Male/Female	24/26	18/12	14/12	p>0.05
CAPD duration (months)	45.5 31.3	38.8 32.2		p>0.05
BMI (kg/m2)	24.7± 3.0	22.5± 2.0	23.3± 2.3	p>0.05
Peritonitis episodes/per year (n, %)				
< 1	12 (24%)			
1-3	33 (66%)			
> 3	5 (10%)			
ESRD etiology				
Glomerulonephritis (n, %)	20 (40%)	12 (40%)		
Diabetes Mellitus (n, %)	9 (18%)	8 (26.6%)		
Hypertension (n, %)	5 (10%)	2 (6.6%)		
VUR (n, %)	4 (8%)	1 (3.3%)		
Unknown (n, %)	6 (12%)	2 (6.6%)		
Others (n, %)	6 (12%)	5 (16.6%)		

VUR: Vesicoureterial reflux

Discussion

Peritonitis is a common complication of CAPD and mostly associated with a microorganism [4]. In non-CAPD patients, few studies have been reported peritonitis induced by surgical glove or glove-powder resulted with intraperitoneal adhesions, adhesive peritonitis and NRLA. In these studies, NRL contact tests were not studied [5,6].

Continuous ambulatory peritoneal dialysis patients who undergo multiple medical procedures may be at an increased risk of NRLA. Gloves and other devices made from NRL are widely used in clinical practice [7] and patients who need frequent or continuous medical treatment have been found to be particularly affected by NRLA or sensitization [8-10]. However, until now, this issue has not been conclusively determined in CAPD patients. By a complete allergic investigation, we evaluated the frequency of NRLA in relation to the frequency of previous peritonitis.

A study examined 996 surgical outpatients by questionnaire

based history for latex sensitivity and determination of NRL-specific immunoglobulin E (IgE) in the serum. However, SPTs or challenge tests were not carried out in this investigation. In 67 of these 996 patients (6.7%), NRL-specific IgE antibodies were found [11].

Natural rubber latex allergy should be considered for all patients especially who have undergone a large number of previous invasive procedures [12]. Latex has been reported as causing immediate hypersensitivity reactions ranging from contact urticaria to severe anaphylaxis. Kalpaklioglu et al. reported that, ESRD patients with no history of hypersensitivity reactions should not be considered as a risk group for developing latex sensitization except frequent exposure history [13]. The frequency of allergy or sensitization to NRL also differs among patients from known risk groups and evidently depends on the geographic origin of the individuals investigated [14,15].

For these reasons we aimed to investigate the relation between recurrent peritonitis and latex sensitization. In this cross-sectional study, we did not find NRLA or sensitization in CAPD patients. The relationship between NRLA and frequency of peritonitis attacks in CAPD patients were not at increased risk of latex-hypersensitivity compared with healthy population in terms of socio-demographic data. Following recent developments in surgical equipments, glove, catheter technologies, including lower proteinized or de-proteinized NRL and newer methods should be an unproven reason.

Repeated operative procedures seem to be a risk factor for NRLA, but not for natural rubber latex sensitization without symptoms in adults. As such procedures often include other diagnostic tests or treatment before and after surgery, this procedure related frequency probably reflects total exposure to the health-care environment.

The immune system is influenced by both uremia and renal replacement therapies [16]. Patients with ESRD show retarded and defective function of T cell activity with a dysregulated-altered Thelper1/Thelper2 balance, interleukin and cytokine network [17,18]. Patients with CAPD showed significantly reduced synthesis of TNF-alpha and IL-1beta and inhibited Thelper phenotype development [19]. Patients with CAPD with and without peritonitis showed immune activation per se and high production of pro-inflammatory cytokines accompanied by a strong pattern of cytokine Thelper2 and a deficiency of IFN-gama production, suggesting heavy immunodeviation Thelper2 and Thelper1 [20]. Both disorders may be hyporeactive against infections, indicating unfavorable innate host defense and impairment of altered cellular response to in vitro NRL.

As a result, uremia related immune dysregulation may be the possible reason of anergy to NRL stimuli in patients on CAPD compared with general population but it remains unclear if this arises from the ineffectiveness of innate immune mechanisms.

There are some limitations of the study. Sample size was small to conclude definite results. The sensitivity and specificity of the SPT is limited in latex-allergic individuals. There are about hundreds of antigens in latex allergic to the people and the screening tests that were done in our study were unable to verify all of these (The SPT test is not Food and Drug Administration approved and globally there is an urgent need for standardized latex SPT reagent) [21,22].

Larger studies are required to elucidate latex allergy, which is a rare but a serious complication and therefore deserves preventive measures.

Competing interests

The authors declare that they have no competing interests.

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