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ORIGINAL ARTICLE

Comparison of nasal smear eosinophilia with skin prick test positivity in patients with allergic rhinitis

Alerjik rinitli hastalarda alerjik deri pozitifliği ile nazal smear'deki eozinofilinin karşılaştırılması

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Objectives: The aim of this study was to compare the usefulness of nasal smear eosinophilia with skin prick test for the diagnosis of allergic rhinitis and to determine the degree of correlation between the tests.

Patients and Methods: Forty-one patients (16 males, 25 females; mean age 35.17; range 14 to 56 years) with a clinical history suggestive of nasal allergy and fifteen controls (7 males, 8 females; mean age 27.6; range 16 to 40 years) without any history of allergy were enrolled in this study. Skin sensitivity tests were applied in both groups. Nasal smear was examined by light microscopy.

Results: A positive skin test reaction was demonstrated in 73.2% of the study group and 20% of the controls whereas 73.2% of the patients and 13.3% of the controls demonstrated significant nasal smear eosinophilia. There was 25.5% correlation between the skin prick test and nasal smear eosinophilia, although this was not statistically significant.

Conclusion: Both the skin prick test and the nasal smear eosinophilia showed correlation with the clinical history but there was no statistically significant correlation between the two tests.

Key Words: Allergic rhinitis; skin-prick test; nasal smear; eosinophilia.

Amaç: Alerjik rinit tanısında kullanılan deri testi ile nazal smear'de saptanan eozinofilinin kullanılabilirliği ve bu iki test arasındaki ilişkinin derecesi karşılaştırıldı.

Hastalar ve Yöntemler: Çalışmaya klinik öyküyle nazal alerjiden şüphe edilen 41 hasta (16 erkek, 25 kadın; ort. yaş 35.17; dağılım 14-56) ve öyküsünde alerjiyle ilgili herhangi bir şikayeti olmayan 15 gönüllü (7 erkek, 8 kadın; ort. yaş 27.6; dağılım 16-40) alındı. Her iki gruba alerjik deri testi uygulandı. Nazal smearler alınıp ışık mikroskobu altında değerlendirildi.

Bulgular: Çalışma grubundaki hastalarda, deri testinin pozitiflik oranı %73.2 iken kontrol grubunda bu oran %20 idi. Bununla birlikte hastaların %73.2 ve kontrol grubunun %13.3'ünde nazal smearde eozinofili saptandı. Her ne kadar alerjik deri testi ile nazal smear arasında %25.5 oranında bir ilişki olsada alerjik deri testi ile nazal smear'de saptanan eozinofili arasında istatistiksel olarak anlamlı bir ilişki yoktu.

Sonuç: Alerjik deri testi ve nazal smearde saptanan eozinofili, klinik öykü ile ilişki göstermekle birlikte, bu iki test arasında istatistiksel olarak anlamlı bir ilişki bulunamadı.

Anahtar Sözcükler: Alerjik rinit; alerjik deri testi; nazal smear; eozinofili.

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Rhinitis is a common heterogeneous disorder characterized by nasal symptoms such as rhinorrhea, sneezing, nasal congestion and itching. Approximately 50% of all cases of rhinitis are caused by allergy. In the case of rhinitis caused by allergens symptoms arise as a result of inflammation induced by a gamma globulin E (IgE) mediated immune response to specific allergens such as pollens, molds, animal dender and dust mites. The immune response involves the release of inflammatory mediators and the activation and recruitment of cells to the nasal mucosa.[1]

Data regarding the true prevalence of AR is difficult to interpret in various countries epidemiologic studies range from 3% to 19%.[2]

The diagnosis of AR is based on a typical history and physical examination. Also laboratory tests are used fort the confirmation of AR. These tests can be classified into two groups: definitive and adjunctive tests. Skin prick tests are used for definitive testing for atopy. The adjunctive tests are smear of nasal secretions and assay of total and specific IgE.[3] A number of adjunctive tests have traditionally been used to confirm the clinical diagnosis of AR. Allergic rhinitis is suggested by the presence of eosinophils in stained smears of nasal secretions. If more than 25% of the cells on the nasal smear are eosinophils, allergy is likely.[3]

The gold standart of allergy testing is generally considered to be skin testing. The basis of this procedure is the reaction between antigen and sensitized mast cells in the skin, producing the classic wheal and flare skin response. This reaction begins with an acute phase that starts within 2 to 5 minutes, reaches a maximum at 10 to 20 minutes, and is characterized by vasodilation (producing erythema) and local edema (producing a wheal). It may be followed by a late phase, with further whealing and induration occurring 4 to 6 hours or more later.[4]

The purpose of this study was to evaluate correlations between skin prick test and nasal smear eosinophilia in patients with AR.

PATIENTS AND METHODS

Forty-one patients who had been thought with AR and fifteen volunteers with no nasal symptoms were included in this study. The study was conducted in the 2nd Department of ENT at Kartal Research and Educational Hospital in Istanbul, between November 2003 and April 2004. In the study group; there were 16 males, 25 females; ages ranging 14-56 (mean age of 35.17 years). In the control group; there were 7 males and 8 females, ages ranging 16-40 (years mean age 27.6 years). On admission, patients demographic and clinical data were recorded on a standard questionnaire. All symptoms were noted. The presence or absence of a family history for atopy and atopic symptoms (asthma, conjunctivitis, atopic eczema) were also noted. AR was defined as a clinical syndrome of sneezing, pruritus, rhinorrhea, and nasal congestion.

TABLE I

SKIN TEST RESULTS

Skin test	Study group		Control group		*Total*		*p*
	n	%	n	%	n	%	
Positive	30	73.2	3	20.0	33	58.9	0.001*
Negative	11	26.8	12	80.0	23	41.1	

*: p<0.01, Statistically more significant

TABLE II

NASAL SMEAR RESULTS

Skin test	Study group		Control group		*Total*		*p*
	n	%	n	%	n	%	
Positive	30	73.2	2	13.3	32	57.1	0.001*
Negative	11	26.8	13	86.7	24	42.9	

*: p<0.01, Statistically more significant

After the anterior nasal endoscopic examination, patients underwent nasal smear for eosinophils and skin tests to inhalant allergens. Exclusion criteria were pregnancy or possibility of pregnancy, lactation, receiving local or systemic steroid treatment, acute respiratory infection and serious systemic disease.

Medications inhibiting wheal and flare reactions to histamine were withdrawn at least 7 days prior to the testing procedures. Allergy skin tests were performed by the prick method with commercially available common allergens including grass, tree, and weed pollens (Mixture of 4 cereales; barley, maize, oat, wheat, Betulaceae, Mixture of 5 grasses, Fagaceae, Compositae); mold spores (Alternaria Alternata, Aspergillus mix, Cladosporium, Penicillium mix); house dust mites (Dermatophagoides pteronyssinus and Dermatophagoides farinae); Epithelia and insect (Feather mix, Cat hair, Dog hair, Cockroach). Histamine hydrochloride 10 mg/ml and 50% glycerol-saline solutions were used as positive and negative controls respectively. The extracts of 15 different allergens from stallergenes Laboratories (Fresnes, France) administered on the volar surface of the arm of the patients. Test reactions were graded by comparison to a positive control within 20 minutes. When an allergen-induced wheal size was the same or larger than that caused by histamine, the skin test result was recorded as 3+ or 4+ respectively, 50% and 25% of the wheal size for histamine were recorded as 2+ or 1+ respectively.[5] Nasal secretions were gently obtained from the inferior turbinate surface using a cotton wipe to prepare slides. These slides were air dried and immediately fixed in 95% alcohols. The smears were stained by the Giemsa method and examined by light microscopy. More than 10% eosinophils in inflammatory cells in nasal secretion were taken as positive reaction.

Statistical analyses were calculated by computer using the Statistical Package for Social Sciences (SPSS) for windows, version 10.0. The statistical analyses were performed using the chi-square and Spearman correlation tests. P values less than 0.05 were considered significant ($p<0.05$).

RESULTS

Skin test Results

Thirty patients (73.2%) had positive reaction to one or more allergens but the remaining did not react to any of the allergens (26.8%) Many of these patients showed sensitivity to multiple allergens (Table I). Six patients did not react to any allergen but had eosinophil count in their nasal smears.

In the control group, three patients (20%) reacted to some of the allergens, 2 of whom had sensitivity to multiple allergens. The remaining 12 patients (80%) did not react to any of the allergens.

The skin test positivity of study group was found more significantly than control group ($p<0.01$).

Nasal smear results

Thirty patients (73.2%) had an eosinophilia on nasal smears. The remaining 11 patients (26.8%) did not have any eosinophilia in their smear, although they reacted positively to the skin test. In the control group, only two patients (13.3%) had eosinophilia, the other 86.7% being negative. Nasal smear results showed that in Table II.

The nasal smear positivity of study group was found more significantly than control group ($p<0.01$).

The relationship between the skin sensitivity test and nasal smear eosinophlia is shown in Table III. A total of 73.2% of patients had a positive skin test and 73.2% were positive for eosinophilia, 58.6% had either a positive skin test and/or nasal eosinophilia, demonstrating a degree of correlation which was, however not statistically significant (Spearman correlation tests; $p=0.103$, $p>0.05$).

The sensitivity of the skin test was 0, 80, whereas that of the nasal eosinophil count was 0.80 too. The specificity was 0.45 for the skin test positivity and 0.45 for eosinophilia too.

TABLE III

THE RELATIONSHIP BETWEEN THE SKIN SENSITIVITY TEST AND NASAL SMEAR RESULTS

	Skin test					
	Positive		Negative		*Total*	
	n	%	n	%	n	%
Smear						
Positive	24	58.6	6	14.6	30	73.2
Negative	6	14.6	5	12.2	11	26.8
Total	30	73.2	11	26.8	41	100.0

$\chi^2=2.657$; $p=0.103$ ($p>0.05$).

Although the rate of positive correlation between nasal smear and skin test in the study group was found 25.5%; this was not significant statistically. Besides, although the rate of negative correlation between nasal smear and skin test in the control group was found 19.6%; but this was not significant statistically too (p=0.484; p>0.05).

DISCUSSION

The diagnosis of nasal allergy is made based on the basis of a typical history, combined with characteristic symptoms and physical findings. Confirmation of diagnosis of AR can be done by in vivo and in vitro tests. Skin prick tests and nasal smear examination are among important tests.[6]

The purpose of this study was to compare of nasal smear eosinophilia with skin prick test for the diagnosis of AR and to determine the degree of correlation between these two tests.

We found that 73.2% of patients in study group have positive reaction to one or more allergens. This rate was found closer to the rate obtained by Takwoingi et al.,[6] which is 90%. In previous studies this rate was lower than our rate. It may be due to concomitant worldwide rise in prevalence of allergic diseases.[7]

The overall proportion of nasal smear eosinophilia was found 73.2% in study group and 13.3% in control group. In the study of Takwoingi et al.[6] they found this rate as 76%. The other researchers found this rate as 45.2% and 69.2%.[7-9]

A positive skin test reaction was demonstrated in 90% and nasal smear and eosinophilia in 76% and 66% correlation between skin test and nasal eosinophilia. But this results were not statistically significant in the Takwoingi's[6] study.

We found correlation between nasal smear eosinophilia and skin tests. The rate of positive skin tests was 73.2% and the rate of eosinophilia was 73.2% and the rate of a positive skin tests and/or nasal smear eosinophilia was 58.6%, but this not statistically significant also.

Although skin prick test and nasal smear eosinophilia are useful in diagnosis of AR and correlates with clinical history, there is no statistical significancy between these two tests.

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