ORIGINAL RESEARCH

Relationship of Nasal Cytology with Clinical Diagnosis

Havva Erdem[1], Yasin Yağız[2], Hilal Balta[3]

Abstract

Aim: Nasal mucosa is one of the easily accessible areas to evaluate the upper respiratory tract. In this study, the clinical significance of nasal mucosal smear was examined.

Material and method: 26 cases were included in the study. Of these cases, 21 allergic rhinitis, 5 non-allergic upper respiratory tract infections. Nasal swabs taken from these cases were examined under a microscope. Inflammatory and epithelial cells were counted. Hemogram findings of the cases were determined from the automation system.

Results: 12 of the cases were male and 14 were female. The age distribution varied between 13-75 years old. Inflammatory cells in nasal swab; The allergic and non-allergic group grade ratios (eosinophil, mast, neutrophil, goblet) were as follows, respectively (0.15 / 0; 0.28 / 0; 2.66 / 2.4; 0.4 / 0.33).

Statistically, the only significant, positive correlation was between basophil and clinical diagnosis (p = 0.039). There was no significant relationship between the clinical diagnosis and otherbiochemical markers (hemoglobin, white blood cell, red blood cell, monocyte, eosinophil, neutrophils) (respectively; p = 0,301; 0,301; 0,301; 0,252; 0,414).

Conclusion: Microscopic evaluation of nasal swabs, together with clinical parameters, may be helpful in diagnosis, follow-up and treatment of cases.

Keywords: Nasal swab, cytology, eosinophil, basophil, diagnosis, follow-up, treatment.

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Introduction

The most appropriate area to evaluate the effects of mucosal inflammation in the airway mucosa is the nasal mucosa. Since Hansel first reported the examination method in 1934, many studies have been conducted[1-3].

Changes in nasal epithelial cells after exposure to physical and chemical inflammatory factors were particularly noticeable[4]. This evaluation; due to its wide approach, simplicity and non-invasiveness, it is an easily reproducible and usable method in patients of different ages[5]. However, it is a method used for research purposes rather than routine examination.

There is no consensus on rino cytology standards. There are few reports on normal values for rhino cytology, but it is important to determine the classification for mucosal inflammation, categorized the inflammatory state, update the progression of inflammation, and evaluate the treatment of inflammation[6]. Common rhino cytological examination consists of nasal secretion, nasal lavage, nasal brush, and biopsy of the nasal mucosa.

In this study, it was aimed to reveal the relationship between allergic rhinitis (AR) and non-allergic group disease (NA), which were sampled by nasal swab method and evaluated clinically and microscopically.

Material and method

26 cases from 2017 were included in this study. Nasal cytological sampling was performed in the cases. Before taking a nasal mucosal swab, the patient was asked to clear excess intranasal secretions. Then, a swab was taken from the mucosal surface.

[1]Department of Pathology, Ordu University of Medical Faculty, Ordu, Turkey, [2]Department of Otorhinolaryngology, Amasya University Sabuncuoğlu Serefeddin Training and Research Hospital, [3]Department of Pathology, FıratOrdu University of Medical Faculty, Elazığ, Turkey.

Corresponding Author: Havva Erdem, Department of Pathology, Ordu University of Medical Faculty, Ordu, Turkey. Phone: 90(452) 226 52 14, e-mail: drhavvaerdem@gmail.com

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The sample taken was fixed with a 95% alcohol solution. It was then stained with may grünwald giemsa (MGG) and hematoxylin eosin (H&E). Cells (eosinophil, mast, neutrophil, ciliated epithelium, goblet cell, squamous epithelium, cubic epithelium) were evaluated in light microscopic examination (figure-1 (A-D). Blood values (hemoglobin, white blood cell, red blood cell, monocyte, eosinophil, neutrophils) were recorded from the automation system. Clinical diagnoses were recorded from patient epicrisis. The rating was done by giving%, counting 10 areas at 100 magnification (x1000)[7]. It was graded according to microscopy.

Statistical analysis

Descriptive statistics were presented as frequencies and per-

centiles for categorical variables and as mean and standard deviations for continuous variables. Relationship analysis between parameters was performed using the Chi-square and Sperman correlation test. SPSS (ver. 18) software was used for analysis. A p-value of $p < 0.05$ was assumed to be statistically significant.

Results

12 of the cases were men and 14 were women. The age distribution varied between 13-75 years (36.5) ((graphic-1). 21 cases were AR, 5 cases were NA (sinusitis (2 cases), nasal polyps (1 case), acute nasopharyngitis (1 case), chronic rhinitis (1 case)). When the ARs were evaluated: the age range ranged between 13-68 (mean: 34.1). The male case was 8, the female case was 11.

According to the microscopic evaluation, the allergic and non-allergic group grade ratios (eosinophil, mast, neutrophil, goblet) were as follows, respectively (0.15 / 0; 0.28 / 0; 2.66 / 2.4; 0.4 / 0.33).

Epithelial cells in allergic rhinitis were as follows in%; Ciliated epithelium was 42.5, squamous epithelium: 6.66, cubic epithelium: 26.9 (graphic-2).

Epithelial cells in non-allergic rhinitis were as follows in%; The ciliated epithelium was 46, squamous epithelium: 4, cubic epithelium: 28 (graphic-3).

The only significant, positive correlation was between basophil and clinical diagnosis ($p = 0.039$) (Table-1). When the correlation between the clinical diagnosis and other biochemical markers (hemoglobin, white blood cell, red blood cell, monocyte, eosinophil, neutrophils, basophil) were evaluated. Statistically, there was no significant relationship between the clinical diagnosis and other biochemical markers ((hemoglobin, white blood cell, red blood cell, monocyte, eosinophil, neutrophils) (respectively; p = 0,301; 0,301; 0,301; 0,252; 0,414).

Discussion

AR is quite common and affects 10-30 % of children and adults, especially in industrialized countries[8]. Today, this situation is gaining importance not only in terms of economy but also because of its effect on quality of life. Chronic cases of rhinitis are associated with intellectual functioning and recreational activities as well as poorer job or school performance and can affect sleep. When evaluating chronic rhinitis clinically, whether it is allergen-related or not, as well as the presence of congestion, rhinorrhea, sneezing, nasal itching and nasal congestion, seasonality is important. In addition, age and the presence of other chronic diseases should be questioned. There are publications that divide into subtypes according to the distribution of cells in the microscope. These subtypes can also coexist. Therefore, nasal cytology has gained an increasing role in the diagnosis and treatment of rhinitis, and its daily use is recommended by some authors today[9].

In Turkey, AR frequency of evaluation conducted in five different centers in the last one year was reported to be 36.4%-11.8%[8]. In this study, the age distribution was mostly young. The age distribution ranged from 13 to 68 years (mean: 34.1).

In the diagnostic classification performed by Howarth et al.[7], the group containing 1-4 positive eosinophils was allergy, nonal-

Table-1: Relationship between diagnosis and blood basophil level

	blood basophil levels (P=0. 039)													
diagnosis		0	0,08	0,40	0,60	0,70	0,749	0,80	0,872	0,90	0,919	1,0	1,3	1,5
0	a	4.8	0	9,5	33,3	14,3	4,8	4,8	0	9,5	4,8	0	9,5	4,8
	b	100	0	100	87,5	100	100	50	0	100	100	0	100	100
1	a	0	50	0	0	0	0	0	0	0	0	50	0	0
	b	0	100	0	0	0	0	0	0	0	0	100	0	0
2	a	0	0	0	0	0	0	100	0	0	0	0	0	0
	b	0	0	0	0	0	0	50	0	0	0	0	0	0
3	a	0	0	0	0	0	0	0	0	0	0	0	0	0
	b	0	0	0	0	0	0	0	0	0	0	0	0	0
4	a	0	0	0	0	0	0	0	0	0	0	0	0	0
	b	0	0	0	0	0	0	50	0	0	0	0	0	0

Allergic rhinitis: 0, Sinusitis:1, nasal polyps: 2, acute nasopharyngitis:3, chronic rhinitis:4

lergic rhinitis with eosinophilia and aspirin sensitivity; group containing 1-4 positive basophils allergy, nonallergic rhinitis with eosinophilia, aspirin sensitivity, nonallergic rhinitis with basophilia; the group containing 2-4 positive neutrophils was evaluated as nasopharyngitis or sinusitis, viral upper respiratory infection, fungal upper respiratory infection, ırritant reaction, possible allergic rhinitis, sinusitis. When we adapted this evaluation to our study, it was seen that eosinophils and mast cells were higher in allergic rhinitis than non-allergic group. Although this increase is not statistically significant, it may be clinically significant. When the neutrophil grade was evaluated, a similar rate of neutrophils was observed in both groups.

No significant change was observed in terms of epithelial cells. Statistical significance was not observed. When the blood table is evaluated, the presence of basophil increase is important in terms of allergic reactions and it was statistically significant. The same change could not be observed in eosinophil and mast cell ratios. This may be due to the small case number. In addition, although there was no statistical significance in terms of blood values, an increase was observed in the allergic rhinitis group compared to the non-allergic group. On the contrary, in terms of neutrophils, a slight increase was observed in the non-allergic group. This increase is probably due to infectious causes.

Allergic rhinitis can be confused with non-allergic rhinitis clinically. Sometimes, nasal polyposis, chronic sinusitis, cystic fibrosis, Wegener's disease, benign and malignant tumors may also be topics that should be considered in the differential diagnosis[10].

In the differential diagnosis; symptoms, history and clinical examination, as well as skin tests and biochemical analysis can usually be sufficient. These methods are generally diagnostic for nonallergic rhinitis[8].

A lot of research has been done in nasal cytological findings and certain value ranges have been tried to be established, and research on new methods is still ongoing[11].

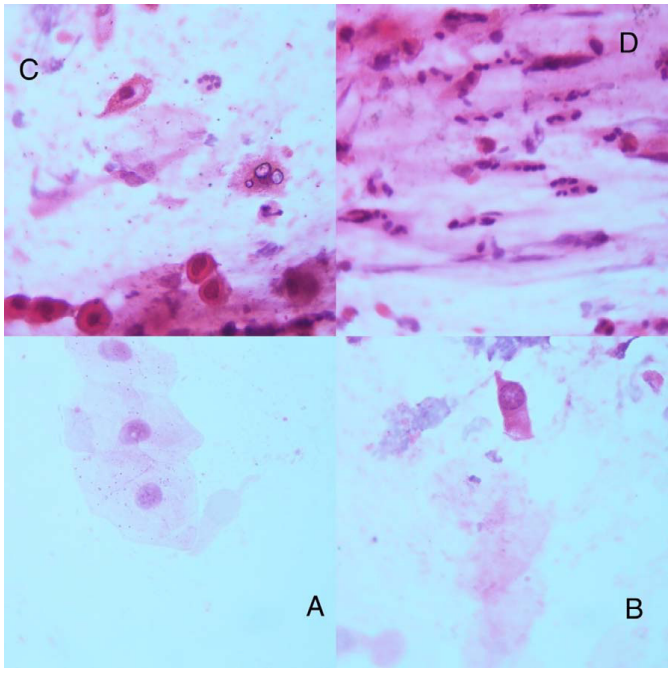
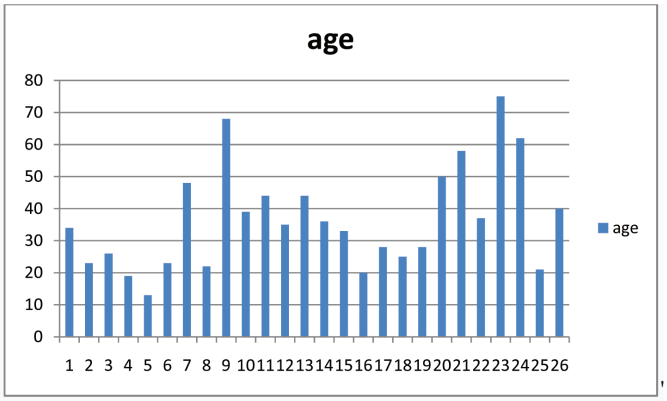


Figure 1. Figures: A- squamous epithelium in a nasal swab, B- ciliated epithelium in a nasal swab, C-cubic epithelium in a nasal swab, D-eosinophils, and neutrophils in a nasal swab (H&EX1000)

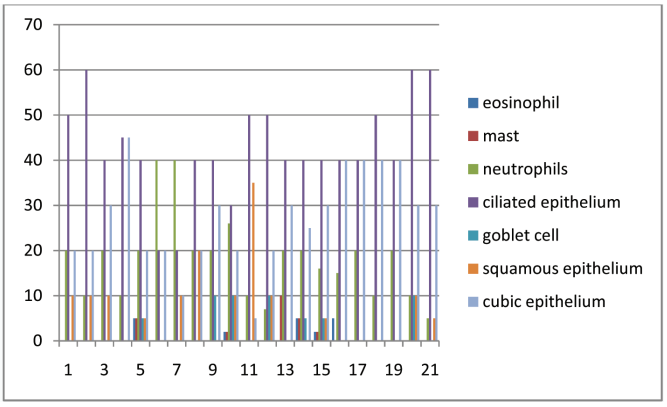
However, nasal cytological findings, being relatively non-specific, led them to be used for research purposes rather than diagnosis.

Immune mechanisms play an important role in allergic rhinitis. When evaluated from this point of view, change in immune response related to age emerges as an important factor in evaluation[12].

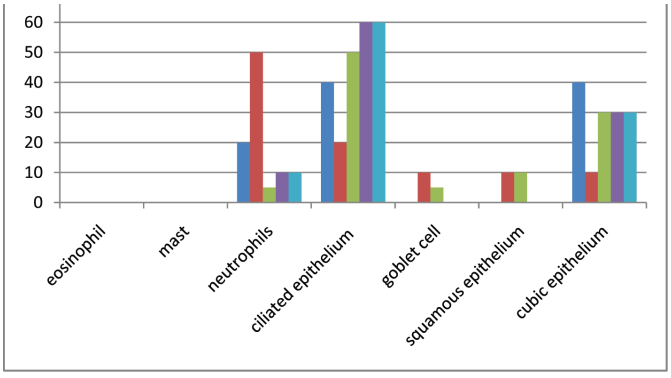
In this study, because the sample was small, grouping by age groups could not be made. In addition, the number of cases belonging to allergic and non-allergic groups and other diagnosis groups is low in this study. Clinically, there are shortcomings in terms of clinical history. These are factors that limit our study. Again,



Graphic-1: Age distribution in all cases



Graph-2:Microscopic evaluation in allergic rhinitis



Graph-3: Microscopic evaluation in non-allergic groups

the lack of a healthy group is one of the limiting factors[9].

As we mentioned above, in this study, there was positive correlation between blood basophil level and clinical diagnosis. Eosinophils and mast cells were found to be higher in allergic rhinitis than non-allergic group. Although this increase is not statistically significant, it may be clinically significant. On the contrary, a slight increase in neutrophils was observed in then on-allergic group.

Conclusion

Nasal swab can be a useful, practical and inexpensive way in diagnosis, treatment and follow-up. In addition, the patient's blood values, clinical history and additional examinations should be taken into account in the evaluation. Evaluating these examinations together in large series may base the results of our study on more robust evidence.

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