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Short Communication

Remodeling of Nasal Mucosa in Patients with Rhinitis

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INTRODUCTION

Rhinitis is a chronic inflammatory process of the nasal mucosa that can progress to structural alterations characterized as airway remodeling such as observed in asthmatic patients [1]. Remodeling is the result of recovering from an inflammatory damage and represents the relationship between an initial inflammation and the subsequent tissue damage. Although not well defined in rhinitis it could be related to increased thickness of basement membrane, pseudofibrosis and epithelial detachment in hystologic samples of nasal mucosa [2].

The nasal mucosa is a physical barrier to particles, allergens and pollutants and a conditioner for inspired air. The nasal pseudostratified columnar epithelium is separated from the lamina propria by a continuous basement membrane. Chronic inflammation could induce structural changes in the epithelium or lamina própria [3].

Samples of nasal mucosa can be easily obtained allowing the study of pathological alterations of the allergic reaction [4].

Nasal lavage is a relatively noninvasive and easy to perform technique for the quantitative measurement of cell distribution, inflammatory mediators and effect of treatment [5,6].

The simultaneous analysis of the cell infiltrate and the degree of cell activation of nasal secretion and nasal mucosa biopsy samples show differences between the two compartments [7].

Our aim was to study the inflammatory process in samples simultaneously obtained by nasal lavage (NL) and from the nasal mucosa of atopic and nonatopic patients with rhinitis.

Fifty-six young adults (median age of 24.5 years) and a diagnosis of allergic rhinitis (n = 36) and non-allergic rhinitis (n = 20) were submitted to allergy skin tests to common inhalant allergens, nasal lavage (NL) with measurement of albumin and interleukin-8 levels, total and differential cell counting by microscopy. Mucosal histopathology determined the extent of epithelial lesion, and degree of basement membrane thickening. All patients with rhinitis had nasal obstruction had undergone correction of deviated nasal septum and (or) turbinectomy for turbinate hypertrophy and were examined before the surgical procedures. Nasal lavage technique was previously described [6].

Nasal mucosa samples from the inferior turbinates were obtained at partial turbinectomy or by mucosal biopsy of the anteroinferior tip of the turbinate and analysed by light microscopy.

The degree of epithelial lesion (EL) and basement membrane thickening (BMT) were based on a score proposed by Ponikau et al., [8].

Symptom-adjusted score (pruritus, sneezing, nasal obstruction, nasal secretion/sniffing, post-nasal secretion/ snorting) and sign-adjusted score (mucosa color, turbinate volume increase, aspect and volume of nasal secretion), were graded on a scale from 0 to 3 (absent, mild, moderate and severe), with a maximum score of 24 [9].

The total symptom score was higher in atopic subjects (9 [1-18]) than in nonatopics (6.5 [0-12]) ($p = 0.01$). Total and differential cell counts, as well as albumin and IL-8 levels, are shown in Table 1. The percentage of eosinophils was higher among atopic patients ($p < 0.01$).

The highest sensitivity and specificity for eosinophil counts were 4% in the NL, a cutoff point that differentiated atopic from non-atopic subjects.

Table 1: Total and differential cell count, albumin and IL-8 levels in nasal lavage of atopic and non-atopic subjects.

Nasal lavage	Atopic (n=36)	Non-Atopic (n=20)	P value
Total cells	127,000 (10×10^3-6.134×10^3)	128,000 (24×10^3-682×10^3)	0,90
Neutrophils (%)	41.5 (0-87)	17.5 (0-83)	0,24
Eosinophils(%)	3 (0-66)	1 (0-21)	**<0.01**
Epithelial cells (%)	48 (8-98)	76 (10-100)	0,07
IL-8 (pg/mL)	80 (30-1300)	81.5 (30-604)	0,45
Albumin (µg/mL)	16 (5-338)	16.5 (5-105)	0,67

Median (limits); Mann-Whitney test.

In the presence of some degree of epitelial lesion the findings of nasal lavage were similar in both groups of allergic and non-allergic subjects. There were no differences in BMT regarding the number of eosinophils in the NL . On the other hand, BMT was associated with an increase of neutrophils in the nonatopic (NAT) subjects' NL ($p < 0.01$). The frequency of BMT was similar in atopic (67%) and non-atopic (55%) subjects as well as the proportion of eosinophils and neutrophils in NL of both subgroups.

Therefore these findings may suggest the participation of eosinophils in basement membrane thickening of patients with allergic or non-allergic rhinitis. Activated eosinophils cause epitelial damage and loss of epithelial integrity in rhinitis patients [10].

This study showed that there were some differences in the inflammatory process, but they may result in similar structural damage to the nasal mucosa of rhinitis patients independently of the allergic status.

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