



AUSTRALIAN JOURNAL OF BASIC AND APPLIED SCIENCES

ISSN:1991-8178 EISSN: 2309-8414
Journal home page: www.ajbasweb.com



Nasal Smear and Immunological Changes Associated With Allergic Rhinitis

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ARTICLE INFO

Article history:

Received 12 February 2016

Accepted 29 March 2016

Available online 4 April 2016

Keywords:

allergic rhinitis, nasal smear, IgE and IgG levels in serum with allergic rhinitis patients and IL4 level in serum with allergic rhinitis patients

ABSTRACT

Background: This study is designed to estimate some hematological and immunological changes in patients with allergic rhinitis and of their importance value that may prepare a suitable help to the medical staff for management. **Methods:** This study was conducted in the period from November / 2014 and up to march / 2015 in allergy Center / Hilla in Babylon, included 82 patients with allergic rhinitis (43 males and 39 females) with a mean age equal to (36.3 ± 1.46) years and (30) a sample of healthy people (15 males and 15 females) with a mean age equal to (33.4 ± 1.5) years. **Results:** Concerning the eosinophils cells were seen in the secretion mucous from the nose (50%) of the patients, while in healthy rate (13.3%), as well as been watching neutrophils cells and lymphocytes in the secretion rate (18%) and (25%) of the patients, while for healthy people (3.3%) and (6.6%) respectively. Concerning the immunological parameters; the results of the study showed that the values immunoglobulin E of patients higher than healthy controls with statistically significant difference ($p < 0.001$), also found in this study indicate that the values of (IgE) for patients significantly increased with smoking, immunoglobulin G and interleukin 4 of allergic rhinitis patients are higher than controls. **Conclusion:** The results of our study shows significant higher percentage of eosinophils in nasal smear with allergic rhinitis patients than controls, also serum IgE in allergic rhinitis patients significantly higher than controls and serum IgG and IL4 in allergic rhinitis patients insignificant, but in this study that results in a patients (male and female) is higher than controls.

INTRODUCTION

Rhinitis is broadly defined as inflammation of the nasal mucosa. It is a common disorder that affects up to 40% of the population. Allergic rhinitis is the most common type of chronic rhinitis, affecting 10 to 20% of the population, and evidence suggests that the prevalence of the disorder is increasing. Severe allergic rhinitis has been associated with significant impairments in quality of life, sleep and work performance (Dykewicz, *et al.*, 2010)

In the past, allergic rhinitis was considered to be a disorder localized to the nose and nasal passages, but current evidence indicates that it may represent a component of systemic airway disease involving the entire respiratory tract. There are a number of physiological, functional and immunological relationships between the upper (nose, nasal cavity, paranasal sinuses, pharynx and larynx) and lower (trachea, bronchial tubes, bronchioles and lungs) respiratory tracts. For example, both tracts contain a ciliated epithelium consisting of goblet cells that secrete mucous, which serves to filter the incoming air and protect structures within the airways. Furthermore, the submucosa of both the upper and lower airways includes a collection of blood vessels, mucous glands, supporting cells, nerves and inflammatory cells. Evidence has shown that allergen provocation of the upper airways not only leads to a local inflammatory response, but also to inflammatory processes in the

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To Cite This Article: Prof. Dr. Saad Merzah Hussein, Assist. Prof. Dr Safaa Hussein Alturaihy and Hussein Mahdi Kudhium., Nasal Smear and Immunological Changes Associated With Allergic Rhinitis. *Aust. J. Basic & Appl. Sci.*, 10(8):1-5, 2016

lower airways, and this is supported by the fact that rhinitis and asthma frequently coexist. Therefore, allergic rhinitis and asthma appear to represent a combined airway inflammatory disease, and this needs to be considered to ensure the optimal assessment and management of patients with allergic rhinitis (Bourdin, *et al.*,2009)

The aim of this study was to investigate the inflammatory cells in nasal smear and levels of immunological parameters such as immunoglobulin E, immunoglobulin G and interleukin 4 in patients presented with rhinitis symptoms and. In addition, it has been analysed the relationships between these parameters with the severity of symptoms. (Bourdin, *et al.*,2009)

MATERIALS AND METHODS

Subjects:

The study was done in Allergy Center Hilla in Babylon. The total number of subjects involved in the study were 82 patients and 30 healthy control, The study group consisted of 43 males and 39 females , The age distribution of study group ranged from 7 to70 years. The patients with allergic rhinitis (43 males and 39 females, total 82), assessed by specialist doctor on the basis of history, clinical examination . Thirty healthy subjects were included in this study as control group consisted of 15 males and 15 females.

The patients were asked if they had any symptoms of rhinitis like itching, watery rhinorrhea, sneezing , pain, nasal mucosal swelling or others. Patients who experienced any of these symptoms were included in the study.

Results:

1. Nasal Smear in Allergic Rhinitis:

1.1 Neutrophils Percentage in Nasal Smear:

Figure 1.1: shows the percentage of neutrophils in nasal smear with allergic rhinitis patients group were:18.29 % and control group were 3.33%.

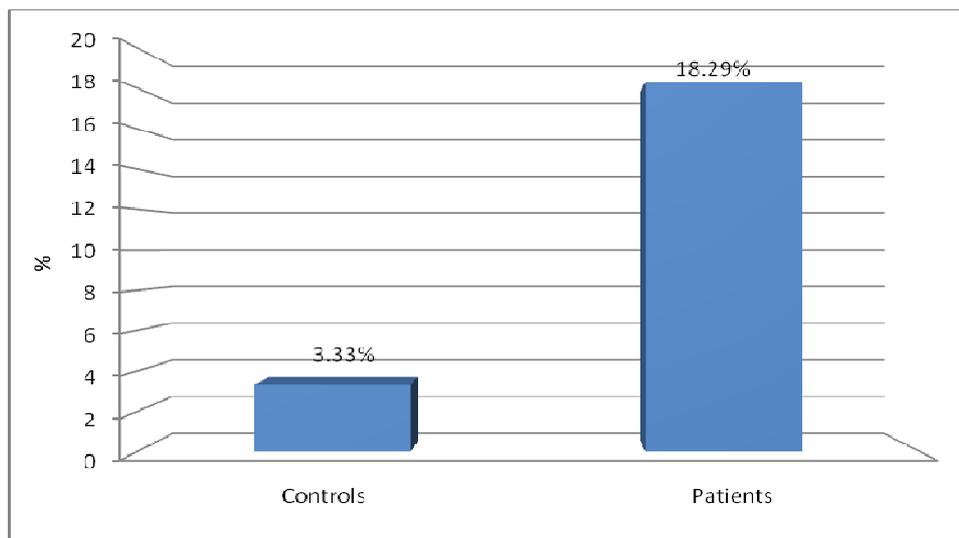


Fig. 1.1: Percentage of neutrophils in nasal smear of patients with allergic rhinitis and control group.

1.2 Eosinophils Percentage in Nasal Smear:

Figure 1.2: shows the percentage of eosinophils in nasal smear with allergic rhinitis patients group were:50 % and control group were 13.3%.

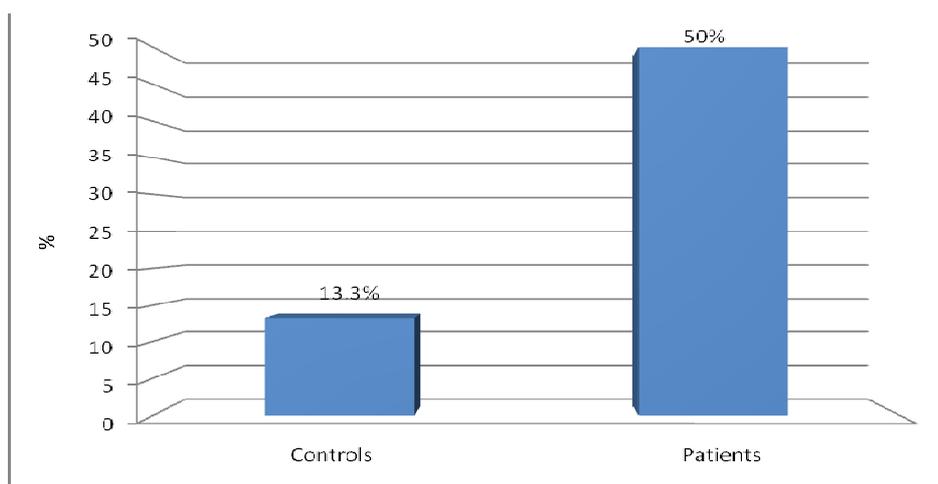


Fig. 1.2: Percentage of eosinophils in nasal smear of patients with allergic rhinitis and control group.

1.3 Lymphocytes Percentage in Nasal Smear:

Figure 1.3: shows the percentage of lymphocytes in nasal smear with allergic rhinitis patients group were: 25.60% and control group were 6.66%.

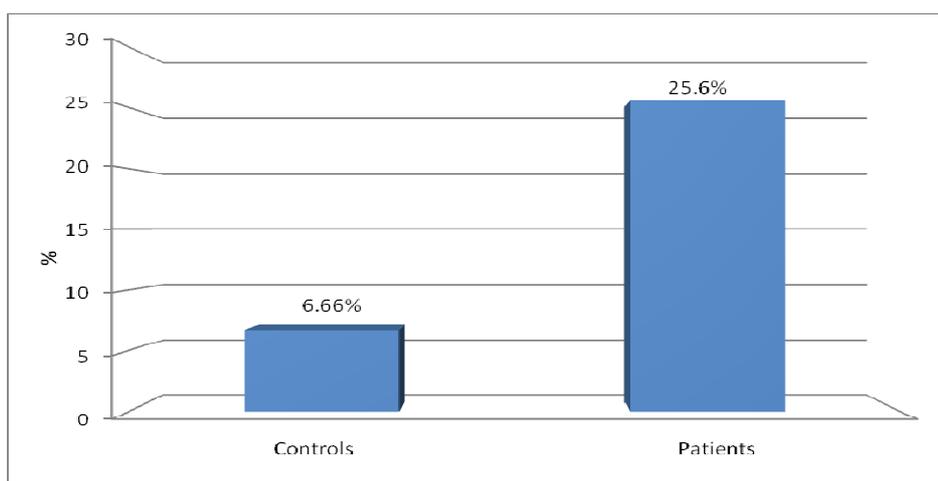


Fig. 1.3: Percentage of lymphocytes in nasal smear of patients with allergic rhinitis patients and control group.

2. Immunological Tests:

2.1 Serum Immunoglobulin E (IgE):

The serum immunoglobulin E (IgE) level for patients with allergic rhinitis were: 101.11 ± 17.614 ng/ml and while control group was: 62.205 ± 9.951 ng/ml (Table 2.1). The values of patients with allergic rhinitis show significant difference ($p < 0.01$) in comparison with control group.

Table 2.1: The serum immunoglobulin E (IgE) level for patients with allergic rhinitis and control .

Groups	Serum IgE mean \pm S.E
Control	62.205 ± 9.951 ng /ml
Allergic rhinitis patients	101.11 ± 17.614 ng /ml

** Significant differences at ($p < 0.001$)

2.2 Serum Immunoglobulin G (IgG):

The serum immunoglobulin G (IgG) level for patients with allergic rhinitis were: 20.818 ± 2.327 mg/ml and while control group was: 15.036 ± 2.395 mg/ml (Table 2.2) . The values of patients with allergic rhinitis show insignificant difference ($p > 0.05$) in comparison with control group.

Table 2.2: The serum immunoglobulin G (IgG) level for patients with allergic rhinitis and control .

Groups	Serum IgG mean± S.E
Control	15.036 ± 2.395 mg/ml
Allergic rhinitis patients	20.818 ± 2.327 mg/ml

** Significant differences at (p<0.001)

2.3 Serum Interleukin 4 (IL4):

The serum interleukin 4 (IL4) level for patients with allergic rhinitis were: 349.01 ± 115.01 pg/mL and while control was 203.52 ± 21.257 pg/mL (Table 2.3) . The values of patients with allergic rhinitis show insignificant difference (p > 0.05) in comparison with control group.

Table 2.3: The serum interleukin 4 (IL4) level in patients with allergic rhinitis and control .

Groups	Serum IL4 mean± S.E
Control	203.52 ± 21.257 pg/mL
Allergic rhinitis patients	349.01 ± 115.01 pg/mL

** Significant differences at (p<0.001)

3. Discussion:

3.1 nasal Smear:

From the study, we observed eosinophilia was evident in their nasal smears in patients with allergic rhinitis (50%) compared with controls group (13.3%) (Figure 4.16). These results agree with the results of other studies Mehdi, *et al.*,(2010), who found that the results of the nasal secretions contain increasing the number of eosinophils (51%) in patients and in control group (11.5%).

Also, from the study, we observed neutrophilia and lymphocytes were evident in their nasal smears in patients with allergic rhinitis (18.29% and 25.6%) compared with control group (3.33% and 6.66%) respectively (Figures 4.15 and 4.17). These results agree with the results of other studies Howarth, *et al.*,(2005) who found that the results of the nasal secretions contain the number of neutrophils and lymphocytes in patients and in control group.

3.2 Immunology :

3.2.1 Serum Immunoglobulin E (IgE):

The results of the present study showed that serum immunoglobulin E(IgE) levels for patients with allergic rhinitis were increased(p< 0.01) compared with the control group (Table 2.1). These results agree with results of other studies(Dhar, *et al.*, 2005 ; Choi, *et al.*, 2005 ; Ogunbileje, *et al.*,2010; Mooney, *et al.*,2013). Furthermore the study agree with Ogunbileje, *et al.*,(2010), whom found that the results of serum immunoglobulin E (IgE) levels patients was significantly greater than controls. A study by Mooney *et al.*, (2013) has shown that Higher serum total IgE levels are known to be associated with allergic rhinitis.

3.2.2 Serum Immunoglobulin G (IgG):

The levels of immunoglobulin G (IgG) in serum of our study for patients with allergic rhinitis show no significant (p> 0.05) compared with control group, but we found in this study that the results in a patients group were higher than control group (Table 2.2). These results agree with results of other study Boyce, *et al.*,(2010) who found that the gliadins and glutenins in wheat may increase specific IgG levels.

3.3.3 Interleukin 4 (IL4):

The levels of interleukin 4 (IL4) in serum of our study for patients with allergic rhinitis show no significant (p> 0.05) compared with control group, but we found in this study that the results in a patients group were higher than control group (Table 2.3). These results agree with results of other study Song, *et al.*,(1996) who found that excessive IL-4 production by TH2 cells has been associated with elevated IgE production and also sudha, *et al.*,(2010), who found that increase the levels of interleukin 4 (IL4) in serum for patients group.

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