ORIGINAL ARTICLE

Title: Comparison of salivary IgA, tear IgA and serum IgE in patients suffering from chronic rhinosinusitis

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Abstract

Objective; Chronic rhinosinusitis is one of the most common inflammatory diseases around the world which imposes two percent of the world population. Studying the impact of chronic inflammation on immunoglobulin production is a subject of different investigations. This study conducted to evaluate the effect of chronic inflammation on secretory immunoglobulin production and allergic reaction. Therefore, in the current research, we compared salivary IgA, tear IgA and serum total IgE levels of patients suffered from chronic rhinosinusitis with normal subjects to reveal the up regulation of these immunoglobulins in chronically inflamed mucosa.

Patients and Method; we monitored immunoglobulins levels of 28 participants including 14 patients with chronic rhinosinusitis and 14 normal control which assayed by Elisa for total IgE and direct immunoenzymatic determination for salivary IgA and tear IgA**.**

Result; there were no significant changes in these immunoglobulin levels as compared to controls. P value of salivary IgA was 0.963, for tear IgA, it was P=0.862 and for serum IgE became P=0.068.

Conclusion; Our study indicated that allergic reaction and mucosal immunity mediated by salivary, lacrimal IgA and serum IgE didn't play an important role in chronic inflammation.

Key words; Rhinosinusitis, salivary IgA, tear IgA, total IgE

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Introduction

Chronic rhinosinusitis is one of the most common diseases around the world which decreases the quality of life and affects up to two percent of the world population [1,2,3.]

Immunoglobulins in body fluids such as saliva, tear drops and serum are important in defense against these infections**.** Secretory IgA is the most important immunoglobulin in the protection of the body from pathogenic microorganisms crossing the mucosal surfaces of the respiratory, gastrointestinal, and urogenital tracts. IgA is major antibody in the clearance of pathogenic organisms from the mucosal surfaces by the means of neutralizing toxins and viral particles, limiting adherence of pathogens, colonization and penetration of mucosal surfaces by pathogenic microorganisms [4-10]. One of the most common congenital immunodeficiency is IgA deficiency. [11,12] IgA deficiency is thought to be a non-important condition needing only common pediatric care. Although one-third of IgA-deficient patients are symptomatic but most of them have no clinical signs. [13] The presence of CRS in predominantly humoral immunodeficiencies, has been reported in few studies. [14,15]

The role of Secretory IgA in the nasal secretion was previously described [16] but there is no information about the salivary IgA, tear IgA level in chronic rhinosinusitis patients.

The present study was done to evaluate the salivary IgA, tear IgA and serum total IgE levels in patients suffered from chronic rhinosinusitis to elucidate the impact of chronic inflammation on up regulation of these immunoglobulins in such patients.

Method and material

Patients and samples

Patients suffered from chronic rhinosinusitis were recruited from the Ear,Nose,Throat section of the university hospital (Mazandaran university of medical science, Sari, Iran) . The study was conducted on a group of 14 patients with chronic rhinosinusitis and 14 healthy participants as control group. Patients and controls were matched for age, sex. We collected whole saliva of oral cavity, eye tear drops and blood samples after consent confirm of the volunteer patients. Onion skin was used to induce tear drops and early samples were taken. The early samples of saliva were collected by canulated tube. The ethic committee of the Mazandaran University of Medical Sciences, Sari, IRAN approved this study. In the opinion of researchers, patients with conditions that could affect the immunoglobulins level, such as malignancy, diabetes mellitus and malnutrition or any other conditions that could make the

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participants unsuitable for the study, were excluded.

Immunoglobulin assay

Fasting samples of the patients including 2 ml of salivary IgA, 1 ml of tear IgA were determined IgA by direct immunoenzymatic determination (DiaMetra,ITALY) . They were then processed and primary outcomes were analyzed by Neophlometric system. All assays were performed at the time of samples collection.We measured fasting serum IgE level by enzyme linked immunoabsorbent assay (ELISA) (Monobind, USA) .

Statistical analysis

The planned sample size of 28 patients including 14 patients with chronic rhinosinusitis and 14 controls was considered appropriate for assessment of immunoglobulins values and to provide statistical power sufficient for exploratory statistical data analysis. Data are presented as mean + SEM. For statistical analysis unpaired *t* test was used for comparison between two groups. P value of less than 0.05 was considered statistically significant.

Results

Study population included 14 cases and 14 controls in each study arm. In case group there was 3(21.4%) male and 11 (78.5%) female versus 6(42.8%) male and female8 (57.1%) in control group. The mean age of control group was 31.5±18.5versus27.7± 15.42 in case group. Demographic information of the study population is summarized in table 1.

No significant difference was observed in these immunoglobulins levels compared to control. Mean ± SEM of salivary IgA was 96.35±22.67 versus97.35±10.35 in control group, P=0.963, for tear IgA Mean ± SEM was 94.64 ± 11.09 against 98.76±10.38 in healthy subjects, P= 0.862 and for serum IgE became 138.14 ± 38.39 versus 61±11.3, P=0.068. (Table 2)

Table 1.Demographic data of the study population

	n	Age (mean±SD)	male	female
chronic rhinosinusitis	14	27.785± 15.428	3(21.4%)	11(78.5%)
Control	14	31.57±18.59	6(42.8%)	8(57.1%)

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Table 2.Comparison of salivary IgA, tear IgA and serum IgE in patients suffered from chronic rhinosinusitis .Data are expressed as means ± SEM.

	Salivary IgA	Tear IgA	Serum IgE
chronic rhinosinusitis	96.35±22.67	94.64 ± 11.09	138.14 ± 38.39
Control	97.35±10.35	98.76±10.38	61±11.3
P value	0.963	0.862	0.068

Discussion

In this research, we evaluated salivary IgA, tear IgA and serum total IgE concentrations in patients suffered from chronic rhinosinusitis to reveal the impact of chronic inflammation on these immunoglobulins level.

Mucosal defense depends on ciliary's epithelium and mucus layer beside innate and adoptive immune system. Secretory IgA (sIgA) is the vital immunoglobulin in mucosal immune system and mediate protection [4-10]. The role of sIgA in defense against microbial pathogens is defined by the fact that most microorganisms are envisaged by the mucous membranes.

Researches established that allergy is associated with delayed or impaired development of IgA [17].

Acute and chronic rhinosinusitis are more common in patients with selective IgA deficiency and different immunodeficiencies [18]. Although studies discussed about the

impaired systemic immunoglobulins level in rhinosinustis our hypothesis was that local up regulation of immunoglobulins play important role in defense against chronic inflammation.

Because chronic rhinosinusitis is one of the forms of mucosal inflammation, we decided to use a noninvasive method to determine the levels of local IgA antibodies in healthy subjects and patients with chronic rhinosinusitis to elucidate the role of immune reactions in the chronically inflamed mucosa.Some researchers reported tear IgA level in normal subjects [19, 20, 21,22] but in the present study we evinced tear IgA

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level in chronic rhinosinusitis and compared it to normal controls to investigate its alteration in chronic inflammation. Our study indicated that chronic inflammation in sinuses will not affect the lacrimal IgA level in comparison to normal controls.

Mandel M A et al [23] showed that salivary IgA level elevated in patients with oral cancer but in contrast in the present study there were no significant change in salivary IgA level as compared to controls.

Our study proved the previous data about the role of secretory IgA in chronic rhinosinusitis. Herein, Chung-Han Hsin et al [16] noted no differences in the levels of secretory IgA and total IgA among the patients with chronic rhinosinusitis.

Immunoglobulin E presents at the lowest serum concentration and has the shortest half-life. IgE is correlated with hypersensitivity and allergic reactions, beside the response to parasitic worm infections [24]. So the role of IgE in inflammatory disorders is a subject of investigations.

In the current research we elucidated that serum IgE level of chronic rhinosinusitis patients did not have significant change in comparison with controls.

The limitation of the present study was the low amount of samples for comparison between groups.

In conclusion, our trial revealed that chronic inflammation in paranasal sinuses will not affect the local production of IgA antibodies in saliva and tear drops as well as serum IgE.

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