

SERUM IGE AND ABSOLUTE EOSINOPHIL COUNT AS PROGNOSTIC MARKER OF ALLERGIC RHINITIS: A CLINICAL STUDY IN A TERTIARY CARE HOSPITALDr. (Mrs) Kalpana Sharma¹ and Dr. Pradeep Singh Rawat*²¹Professor and Head of the Department of Otorhinolaryngology and Head and Neck Surgery, Gauhati Medical College, SSUHS, Guwahati, India.²Post Graduate Trainee, Department of Otorhinolaryngology and Head and Neck Surgery, Gauhati Medical College, SSUHS, Guwahati, India.***Corresponding Author: Dr. Pradeep Singh Rawat**

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ABSTRACT

Introduction: Allergic rhinitis is chronic condition with an estimated prevalence of 20%, as per Allergic Rhinitis and its impact on Asthma (ARIA) guidelines. Owing to lack of parameters or prognostic markers to determine the optimum therapy. The condition is treated by conventional drug therapy. The aim is to establish the role of serum IgE and Absolute Eosinophil Count (AEC) as prognostic markers for optimization of therapy. **Materials and methods:** 50 patients with allergic rhinitis were enrolled and treated according to the step wise therapeutic approach of ARIA guidelines. Pre and Post therapeutic value of serum IgE and AEC was measured. The severity of symptoms was measured using Total 5 Symptom Score(T5SS) at the end of 1, 2, 3, 4 and 6 months. Wilcoxon rank test was used to find the significance of change in the T5SS and Chi-square has been used to find the significance of study parameters. **Result:** Study shows most common age group of allergic rhinitis was between 18-38 years with female predominance (60%). The mean pretherapeutic serum IgE and AEC was 312.48IU/mL and 441.94 cells/mm³ which reduced to 99.55IU/mL and 286.66 cells/mm³ in post therapeutic condition respectively, with p value of <0.05 which was statistically significant. **Conclusion:** Serum IgE is a better prognostic marker then AEC. For the remission of symptoms, the values of serum IgE and AEC post therapeutically should be in normal range.

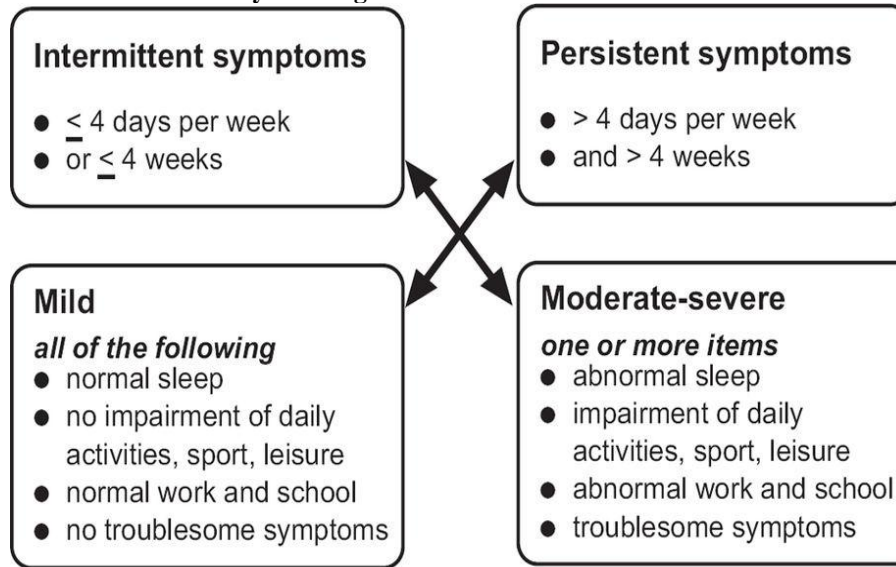
KEYWORDS: Allergic rhinitis, Serum IgE, AEC.**I. INTRODUCTION**

Allergic rhinitis is most common chronic condition with an estimated prevalence of 5-22% in united states, which increases from infancy, peaks in childhood and adolescence and decreases in the elderly.^[1] Incidence of allergic rhinitis is 1.4 to 39.7% of population in the western countries. Incidence is ever increasing because of industrialization and urbanization responsible for environmental pollution. The major cause of the disease are morbidity, absenteeism and restricted activity in both children and adults.^[2]

The lining of nose is continuous with the paranasal sinuses which may also be involved and associated allergic conjunctivitis and bronchial asthma may also occur.^[3] The site of reaction is mainly the mucosa of nasal cavity which is located at the entrance of the respiratory tract and is the chief source of contact of human with environment. It is subjected to injury produced by varieties of disturbing factors such as extremes of cold, heat, moisture, dryness, gases, fumes, dust, pollen, spores, bacteria etc.^[4] According to the socioeconomic status the prevalence in India is 27.1 % in

lower class, 33.3% in middle class, 28.6% in upper class in urban and 11.1% in rural population.^[5,6]

The recent Allergic Rhinitis and Impact on Asthma (ARIA) document has classified allergic rhinitis as: - with Intermittent symptoms < 4 days per week or < 4 weeks; Persistent symptoms > 4 days week and > 4 weeks which is further subdivided into: - mild (normal sleep, daily activities, work and school and no troublesome symptoms) or moderate (Abnormal sleep, Impairment of daily activities, sport, leisure, problems caused at school or work, troublesome symptoms). Allergic Rhinitis is a common disease that, although benign, leads to significant impairment of quality of life and a large health care expenditure.

Table 1: ARIA classification of severity of allergic rhinitis.

II. Aims and objectives

Conventional drug therapy is used to treat patients with allergic rhinitis according to the ARIA (Allergic rhinitis and impact on asthma) guidelines. According to the guidelines the treatment is provided until resolution of symptoms. However, there are no markers to determine the optimum therapy for long lasting remission of the symptoms. Therefore, definite parameters or indicators are required to determine the duration of therapy. In our study, analysis of baseline levels of Immunoglobulin e (IgE) and absolute eosinophil count (AEC) before therapy and subsequent serial measurements of the same during the course of therapy will be carried out. The levels of IgE and AEC will be correlated with resolution of symptoms and the duration of therapy. The aim is to establish the role of serum IgE and AEC as prognostic marker to determine the duration of therapy in management of allergic rhinitis.

III. MATERIALS AND METHOD

Source of data

The study was conducted on the patients of age group between 18 to 60 years and of either sex presenting with Allergic Rhinitis at department of ENT in Gauhati medical college and hospital, Guwahati, during period from June 2017-june 2018

Sample size and method

In this study 50 patients with allergic rhinitis diagnosed by allergic rhinitis questionnaire (ARIA guidelines) were categorized having mild and moderate/severe symptomatology and treated according to the ARIA guidelines.

Data collection

All 50 patients in the study were evaluated before treatment with:

- 1) Detailed history taking and clinical evaluation

- 2) T5SS: Total 5 symptom score (nasal obstruction, rhinorrhea, nasal pruritus, sneezing and ocular symptoms)

- 3) Baseline levels of serum IgE and AEC

Serum IgE may vary as result of season of that each its own serum IgE may vary as geographical location, diet and the year. It is recommended to establish a normal cut off value. In our lab the cut off value was 100IU/ml.

Absolute eosinophil count (AEC)

Venous EDTA blood was subjected to automated analyzer (HORIBA) for Absolute eosinophil count and confirmed by peripheral smear (made by technician and examined by pathologist)

Exclusion Criteria

- 1) Patients with chronic rhinosinusitis infection, chronic purulent post nasal drip, rhinitis medicamentosa.
- 2) Patients with nasal polyposis
- 3) Bronchial asthma patients.
- 4) Patient with prior history of anti-allergic treatment at the beginning of the study.
- 5) <18 years of age >60 years of age.

FOLLOW UP

Patients with allergic rhinitis fulfilling the inclusion/exclusion criteria were enrolled in the study. Patients suffering from mild to moderate/severe allergic rhinitis, were provided with conventional drugs to treat allergic rhinitis as per ARIA guidelines. Follow up visits was at 4 weeks, 8 weeks, 12 weeks and 24 weeks after administering the study drugs.

Assessment tools

Efficacy of treatment was assessed by:

- 1) Measuring percentage reduction in serum IgE and AEC levels at 16 weeks and 24 weeks (for patients with persistent symptoms) from baseline
- 2) Total 5 symptom score at day 1, 4-week, 8-week, 16 weeks and 24 weeks.

STATISTICAL ANALYSIS

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean \pm SD and results on categorical measurements are presented in numbers (%).

Null Hypothesis: There is no significant differences in the mean value between two groups i.e. $\eta_1 = \eta_2$

Alternate Hypothesis: There is a significant difference in the mean values between two groups i.e. $\eta_1 \neq \eta_2$

Level of significance: $\alpha = 0.05$

Decision Criteria: We compare the p-value with the level of significance. If $p < 0.05$, we reject the null hypothesis and accept the alternate hypothesis. If $p \geq 0.05$ we accept the null hypothesis. Wilcoxon rank test was used to find the significance of change in the Total 5 symptom score used pre and post therapeutically. Chi-square has been used to find the significance of study parameters.

IV. RESULT AND DISCUSSION

50 patients from age group who attended the OPD of the department of ENT, with features suggestive of allergic rhinitis were included in the study. The following observations were made: -

Table 2: Age group distribution of the study population.

Age group (years)	No.	%age
≤ 28	22	44.0
29-38	19	38.0
39-48	7	14.0
> 48	2	4.0
Total	50	100.0

Table 5: Pre and post therapeutic value of serum IgE.

Serum IgE	Group			
	Mild	Moderate	Severe	Mean value
Serum IgE pre	138.11 \pm 36.35	258.10 \pm 59.85	1040.70 \pm 575.46	312.48 \pm 365.77
Serum IgE after 4 MThs	93.44 \pm 4.41	95.65 \pm 5.97	130.80 \pm 64.19	99.55 \pm 26.27
Change	44.67 \pm 35.00	162.45 \pm 58.79	909.99 \pm 520.47	212.93 \pm 344.93
p-value	0.001	0.001	0.001	0.001

The mean value of serum IgE pre-therapeutic for the study population was 312.48 IU/ml and post therapeutic the mean value of IgE was 99.51 IU/ml. The mean value of serum IgE pre-therapeutic for 23 patients with mild allergic rhinitis was 138.11 IU/ml and post therapeutic were 93.44 IU/ml. The mean value of serum IgE pre-therapeutic for 20 patients of moderate and 7 patients of severe allergic rhinitis was 258.1 IU/ml and 1040 IU/ml respectively which was reduced to 95.65 IU/ml and 130

Table 3: Gender Distribution of study population.

Sex	No.	%age
Female	30	60.0
Male	20	40.0
Total	50	100.0

The study group comprised of 50 patients between the age group of 18-60 years. Out of which 30 were females contributing to 60% of the sample size, males were 20 in number contributing to 40% of the sample size. Majority of the allergic rhinitis patients (82%) belonged to age group 18-38 years i.e. 44% were in age group 18-28 years and 38% were in age group 29-38 years. The duration of symptoms in the study population had a range from 6 months to 8 years. Majority of the patients (48%) had duration of 2-3 years.

Table 4: Classification into categories based on symptoms.

Allergic rhinitis	No.	%age
Mild	23	46.0
Moderate	20	40.0
Severe	7	14.0
Total	50	100.0

The study population was classified into categories of mild, moderate and severe allergic rhinitis according to their symptoms as per the ARIA guidelines. Out of the total 50 patients in the study, 23 patients (46%) belonged to mild category, 20 patients (40%) to moderate category and 7 patients (14%) as severe category.

Out of 23 patients with mild allergic rhinitis, 22 patients had serum IgE in the range of 80-160 IU/ml, except one patient who had value of serum IgE of 269 IU/ml, 20 patients with symptoms of moderate allergic rhinitis had the value of serum IgE in the range 161-500 IU/ml. 7 patients with severe allergic rhinitis had the serum IgE in range of 500-2000 IU/ml except one patient had the value of 2177 IU/ml.

IU/ml respectively post therapeutic. Post therapeutic the average value of serum IgE for the study population showed statistically significant reduction with a p value of < 0.0001 .

Out of the 23 patients with mild allergic rhinitis 13 patients had the value of AEC within normal range, 10 patients had value less than 1000 cells/mm³. Out of the 20 patients with moderate allergic rhinitis, 15 patients

had serum AEC value within normal range and 5 patients with value less than 1000 cells/mm³. 7 patients presenting with severe allergic rhinitis showed a wide range in the levels of serum AEC: 3 patients out of 7 had

normal AEC value, 1 patient had AEC value less than 1000 cells/mm³, 2 patients had serum AEC less than 2000 cells/mm³ and 1 patient had value of serum AEC less than 3000 cells/mm³.

Table 6: Pre and post therapeutic mean values of SERUM AEC at the end of 4 months.

Serum AEC	Group			
	Mild	Moderate	Severe	Mean value
Serum AEC pre	391.48±142.76	352.65±154.42	862.86±755.36	441.94±343.54
Serum AEC after 4 months	284.83±74.14	275.70±78.76	324.00±122.83	286.66±83.49
Change	106.65±107.01	76.5±103.47	538.86±676.16	155.28±299.86
p-value	0.001	0.050	0.048	0.012

The mean value of serum AEC pre-therapeutic for the study population was 441.94 cells/mm³ and post therapeutic the mean value of serum AEC was 286.66cells/mm³. The mean value of serum AEC pre-therapeutic for 23 patients with mild allergic rhinitis in the study population was 391.48cells/mm³ and post therapeutic mean value was 248.83cells/mm³. The mean value of serum AEC pre-therapeutic for 20 patients with moderate allergic rhinitis was 352.65cells/mm³ and post therapeutic mean value was 275.7 cells/mm³. The mean value of serum AEC pre-therapeutic for 7 patients with severe allergic rhinitis in the study population was 862.86 cells/mm³ and post therapeutic mean value was reduced to 324 cells/mm³. Post therapeutic the mean value of serum AEC for the study population showed statistically significant reduction with a p value of <0.001.

V. CONCLUSION

The mean pre-therapeutic serum IgE for the study population was 312.48 IU/mL which reduced to 99.55 IU/mL in post therapeutically period. This reduction in the mean value of serum IgE was statistically significant with a p value of <0.001. The mean value of serum AEC for the study population pre-therapeutically was 441.94 cells/mm³ which reduced post therapeutically to 286.66 cells/mm³. This reduction in the mean value of serum AEC was statistically significant with p value of 0.012. On comparing the p value of serum IgE with serum AEC, serum IgE was a better prognostic marker which correlates well with severity of symptoms for patients of allergic rhinitis.

The mean improvement in the T5SS score was from 6.40 pre-therapeutically to 0.36 post therapeutically, that was statistically significant with a p value of <0.05. From our study we conclude that it's advisable to classify patients of allergic rhinitis at the time of presentation for better management. Serum IgE and AEC seems to be reliable markers to diagnose allergic rhinitis. Serum IgE had better correlation with severity of symptoms for allergic rhinitis.

We also conclude that for mild to moderate allergic rhinitis serum IgE is a better prognostic marker than AEC. For the remission of symptoms, the values of serum IgE and AEC post therapeutic should be in normal

range. The study should be conducted on a large population to evaluate positive correlation of symptoms with the levels of serum IgE and AEC and to standardize the values of serum IgE and AEC to optimize the duration of therapy for long term remission of symptoms.

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