

Correlation of Symptomatology with Peripheral and Nasal Smear Eosinophilia in Allergic Rhinitis Patients Treated with Oral Antihistamine and Steroid Nasal Spray



Medical Science

KEYWORDS : Allergic rhinitis, Absolute eosinophil count, Nasal smear eosinophil count

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ABSTRACT

AIM: To evaluate and compare the correlation of absolute eosinophil count (AEC) and nasal smear eosinophil count (NSE) with symptoms in allergic rhinitis (AR) patients and to compare their diagnostic and prognostic significance in the management.

METHODS: A prospective study with 100 consenting AR patients of both sexes aged 12-60years done. AEC and NSE estimation were carried out in all cases. Based on symptoms, patients were treated with oral levocetirizine with montelukast and fluticasone furoate nasal spray for a period of 1 month, following which symptoms were reassessed and AEC and NSE estimation was repeated.

RESULTS: Comparing the pretreatment and post treatment values a positive correlation was found between total symptom score (TSS) and AEC. However no correlation was found between TSS and nasal smear eosinophil count. Percentage change in AEC post treatment was more than NSE hence proving it to be a better diagnostic test.

INTRODUCTION

Allergic Rhinitis is one of the most common chronic condition in the developing world. The age, sex, race or socioeconomic status has no bearing with those who get affected. The head and neck is the most common portal of entry of inhalants and food sensitizers. The nose is usually the first site of hypersensitivity response.

Allergic rhinitis involves inflammation of the mucous membranes of the nose, eyes, eustachian tubes, middle ear, sinuses, and pharynx. The nose invariably is involved, and the other organs are affected in certain individuals. Inflammation of the mucous membranes is characterized by a complex interaction of inflammatory mediators but ultimately is triggered by an immunoglobulin E (IgE) – mediated response to an extrinsic protein. The eosinophils have an important role in allergic disorders. The identification of eosinophil leukocytes within nasal and bronchial mucosa and corresponding eosinophilia of nasal secretion, sputum and in blood are common findings of atopic population. In the geographical area where allergens are prevalent, their role as an etiological factor is higher in allergic respiratory disorders.

The diagnosis of allergic rhinitis can be done by combination of valuable history, clinical examination, levels of eosinophils in peripheral blood and nasal smear, skin prick test, radio allergosorbent assay for specific IgE level.

The normal nasal eosinophil percentage was 0-6% (<10) while the normal absolute eosinophil count is considered to be <440 cells/ mm³.

This study was conducted to evaluate and compare the correlation of absolute eosinophil count (AEC) and nasal smear eosinophil count (NSE) with clinical symptoms in patients with allergic rhinitis (AR) and to compare their diagnostic and prognostic significance in the management of allergic rhinitis with oral levocetirizine with montelukast and topical fluticasone furoate nasal spray.

METHODOLOGY

The study was conducted at KIMS hospital, over a period of one year from July 2014 to July 2015. The study was initiated after obtaining ethical clearance from the Institutional Ethics Committee. All the patients who were diagnosed with allergic rhinitis satisfying the inclusion criteria were included in the study by universal sampling, after obtaining informed consent. A total of

100 patients were thus included.

The patients were diagnosed purely based on the history & clinical features typical of allergic rhinitis which included sneezing, rhinorrhoea, nasal itching, nasal obstruction & pale mucosa.

Inclusion criteria

1. Patients who have given consent to be a part of the study.
2. Patients between 12 - 60 years with allergic symptoms.
3. Patients who were not treated with topical steroid nasal spray in the past.

Exclusion criteria

1. Patients who did not give consent to be a part of the study.
2. Patients below 12 years and above 60 years of age.
3. Patients with a history of acute respiratory tract infections in the past one month.
4. Patients who are smokers/known cases of Chronic Obstructive Pulmonary Diseases.
5. Patients with any other forms of rhinitis.
6. Patients who are hypersensitive to levocetirizine or montelukast.
7. Patients who have Eosinophilic conditions.
8. Snuff users.
9. Pregnant women.
10. Patients who were prescribed anti-allergic treatment within past 15 days to one month.

Following inclusion into the study, nasal smear eosinophil count & blood AEC were performed on all the patients. Nasal smear was performed by scraping the mucous membrane over the inferior turbinate using a sterile air dried cotton applicator & transferred to a glass slide. The slide was stained with May-Grunwald & Giemsa stain. AEC was performed on venous blood drawn from the patients' arm using standard procedure. Both the tests were performed by a trained pathologist & the slides for both the tests were reviewed randomly by another trained pathologist.

The patients were then prescribed with oral levocetirizine with montelukast and Fluticasone furoate nasal spray for a month. They were advised to deliver 1 spray to each nostril twice daily (total measuring 200 micrograms/day) for a month. They were asked to return for follow up after a month & were advised to stop the medication 3 days prior to their return. On follow up the patients were assessed for signs & symptoms and nasal smear eosinophil count & AEC.

STATISTICAL ANALYSIS

The data was entered into excel, cleaned, coded. The following methods of statistical analysis have been used in this study, Chi-square/ Fisher Exact test, Paired Proportion test, sensitivity. Data analysis was carried out using statistical software namely SAS 9.2, SPSS 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1.

RESULTS

A total of 100 patients were included in the study with history suggestive of AR. Majority of the patients belonged to the age group of 20-40 years (65%) Mean \pm SD: 33.10 \pm 11.47. The incidence of allergic symptoms was more common in males (63%) compared to females (37%). Female:Male ratio was 1:1.7. Rhinorrhoea (94%), pale mucosa (69%), nasal itching (64%) & sneezing (49%) was observed among majority of patients. Majority of the patients had duration of symptoms ranging between 6 to 12 months and more than 12 months. Most of the patients had moderate to severe symptoms.

76% of patients with symptoms of AR showed elevated pretreatment AEC. Following treatment, 83% of these patients showed a decrease in AEC while in 48% AEC returned to normal. (Table 1 about here).

47% of patients with symptoms of AR showed elevated pretreatment NSE. Following treatment, 26% of these patients showed a decrease in NSE while in 18%, NSE returned to normal. (Table 2 about here).

Post treatment AEC showed a significant improvement (48.0% change) as compared to NSE (18.0% change) in the patients. The difference in the sensitivities of these tests was found to be significant ($p < 0.005$). (Table 3 about here).

Mean total symptom score showed a decrease from 7.5 at presentation to 4.5 (VAS) following treatment. AEC had reduced from a pre treatment value of 557 (mean value) to 442 (mean value) (close to the normal range).

DISCUSSION

In our study, majority of the allergic respiratory cases were of age group between 21 to 40 yrs and with male predominance (63%). This was supported by Mirsaid Ghazi et al, 2003¹ who showed in their study that the incidence in allergic rhinitis increases with age and there was male predominance.

Most of the patients had rhinorrhoea as the most common symptom which is also seen in studies done by Miri S et al, 2006² and Mirsaid Ghazi et al, 2003¹.

Nasal eosinophil count of >10 cells/hpf was considered positive as per IAP text recommendation. Many studies have taken different cut-off values. Sanli et al, 2006³ and Crobach et al, 1996⁴, etc have considered >10 cells as significant similar to the present study. Similarly, blood eosinophil count >440 cells/cumm is considered as significant and this cut off value is also considered by Chowdary et al 2003⁵.

Nasal smear for eosinophilia is a non invasive test and its usefulness in detection of allergic rhinitis has been shown in other studies also done by Akefeh Ahmadiashar et al⁶, Miri et al, 2006² and Miller et al, 1982⁷.

Intranasal corticosteroids have been highly effective in treating allergic rhinitis which correlates well with Parikh et al, 2001⁸.

In this study we have compared the sensitivity of nasal smear eosinophil count with AEC in diagnosis of allergic rhinitis and the sensitivity of NSE was found to be low and the difference in sensitivity was found to be significant ($p < 0.05$) which correlates well with study done by S S Shetty et al, 2014⁹ and Vaidya et al, 2015¹⁰

A positive correlation was found between total symptom score (TSS) and AEC. However not much correlation was found between TSS and nasal smear eosinophil count which is similar to the study done by Lans et al, 1989¹¹.

CONCLUSION

We like to conclude that both AEC (peripheral eosinophilia) and NSE (nasal smear eosinophilia) are diagnostic tests for allergic rhinitis but AEC has a higher sensitivity and positive correlation with symptomatology both pre and post treatment which makes it as a preferred investigation in patients with allergic rhinitis.

ABBREVIATIONS

AR: Allergic rhinitis

AEC: Absolute eosinophil count

NSE: Nasal smear eosinophil count

TABLES

Table 1	Pretreatment n = 100	
	Normal	Abnormal
AEC	24	76
NSE	53	47

Table 1: Pretreatment values

Table 2	Post treatment n = 100	
	Normal	Abnormal
AEC	72	28
NSE	71	29

Table 2: Post treatment values

Table 3	Pre-Treatment (n=100)	Post-Treatment (n=100)	% change	P value
AEC				
Normal	24(24.0%)	72(72.0%)	+48.0%	<0.001**
Abnorml	76(76.0%)	28(28.0%)	-48.0%	
NSE				
<10	53(53.0%)	71(71.0%)	+18.0%	0.0525+
>10	47(47.0%)	29(29.0%)	-18.0%	

Table 3: Comparison of AEC and % Nasal smear for eosinophilia between pre treatment and post treatment.

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