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ORIGINAL ARTICLE

STUDY OF PREVALENCE OF EOSINOPHILIA IN ALLERGIC RHINITIS

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ABSTRACT: **BACKGROUND:** Allergic rhinitis is a common condition, though not life threatening, causes significant morbidity in terms of quality of life. Confirmation of allergen as etiological agent is cumbersome. Hence need for a simple test is vital and eosinophil parameters were looked at to answer the quest. **AIM:** To find out the prevalence of eosinophilia in Allergic rhinitis. To assess the value of nasal cytogram as an alternative investigation in diagnosing allergic rhinitis. **MATERIALS & METHODS:** Prospective study of 200 cases divided into two groups of 100 each was done. One group clinically with allergic rhinitis and other without. All cases had clinical examination after history was taken, Blood Absolute eosinophil count, Nasal smear for eosinophils done and assessed. **RESULTS:** Of the 200 patients examined in two groups of 100 each, mean age of allergic rhinitis patients was 26.22 years. Allergic rhinitis was more common in males than females. Prevalence of nasal eosinophilia was 61%.and blood eosinophilia was 57% in allergic rhinitis patients. Nasal smear sensitivity was 61% and specificity was 87%. **CONCLUSION:** Nasal smear eosinophilia is a valid test, can be quickly and easily performed and read. Being an in-expensive test can be used to screen the patients of allergic rhinitis.

KEYWORDS: Allergic rhinitis, Absolute eosinophilic count, Nasal smear eosinophilia.

INTRODUCTION: Allergy may be defined as a "state of exaggerated susceptibility to various foreign substances and physical agents that are harmless to the great majority of normal individuals. It is the commonest immunologic disease and is the commonest chronic disease experienced by humans. Confirmation of allergen as etiological agent is cumbersome in most setups, moreover IgE estimation and allergy test may not be accessible. Hence a simple test of peripheral smear and nasal smear eosinophil count has been taken as reliable diagnostic tests to address this concern.

MATERIALS AND METHODS: A prospective study was conducted for over 18 months between Jan 2013 and July 2014, with total 200 cases, divided into two study groups of 100 each who attended our ENT OPD. One group consisting of the patients suffering from allergic rhinitis as diagnosed clinically and other group as controls without any signs and symptoms of allergic rhinitis. Prior Ethical committee permission taken and written consent of all the patients included in the study taken.

Nasal symptoms of sneezing, rhinorrhea, nasal pruritis, nasal obstruction and non-nasal symptoms of eye itching, eye watering were recorded. 100 patients with symptoms and signs of allergic rhinitis were taken for evaluation for inclusion into study after fulfillment of both inclusion and exclusion criteria and equal number of controls who presented without any nasal complaints, without any history of allergy were selected for comparison after age and sex matching.

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Inclusion Criteria:

1) Age – 5 – 75 years.
2) Patients with symptoms of allergic rhinitis included in first group with – sneezing, nasal pruritis, rhinorrhea, nasal congestion, eye watering and itching, nasal and pharyngeal itching.
3) Patients after age and sex matching with no allergic symptoms as mentioned above are included in group two as controls.

Exclusion Criteria: Patient with known conditions like filariasis since this area is an endemic zone for filaria and filarial allergy, bronchial asthma, atrophic rhinitis, vasomotor rhinitis, tumours of nose and paranasal sinuses and drug induced rhinitis.

METHODOLOGY: After history taken for allergy, all patients were subjected for clinical examination and laboratory investigations like absolute eosinophil count and nasal smear for eosinophils done. Absolute eosinophil count was done by Direct method. Nasal smear was taken by swab sticks from middle part of inferior and medial surface of inferior turbinate. The slide was fixed in 95% alcohol. Then the alcohol fixed slide was fixed with Haematoxylin and Eosin stain and subjected for eosinophil count study.

Quantitative aanalysis (mean of cells per 10 high power fiel)	semi quantitative analysis	grade
0	none	0
.1-1.0	occassional cells	0.5+
1.1-5.0	few scatters cells or small group	1+
6.0-15.0	moderate number of cells and larger clups	2+
16.0-20.0	larger clumps of cells which do not cover the entire field	3+
>20	large clumps of cells covering the entire field	4+

TABLE 1: GUIDE FOR NASAL CYTOGRAM

RESULTS:

	Allergic rhinitis	**Control group**
Males	52	58
Females	48	42
Total	**100**	**100**

Table 2: Sex distribution

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In the study male predominance was seen in both allergic rhinitis patients (52%) and the control group (58%) whereas female percentage was 48% and 42% respectively.

Sl. No.	Age	Allergic rhinitis	Control group
		No. of patients	No. of patients
1	5-10Yrs	0	0
2	11-15yrs	2	8
3	16-20yrs	17	10
4	21-25yrs	27	9
5	26-30yrs	15	17
6	31-35yrs	19	14
7	36-40yrs	14	13
8	41-45yrs	3	8

Table 3: Age Distribution

In the study 60% of the allergic rhinitis patients were up to the age of 30 years. Mean age of the allergic rhinitis group is 26.22.

		Frequency	Percentage
Nasal Eosinophilia	<1+	39	39
	≥1+	61	61
	Total	100	100
Blood Eosinophilia	<350 cells/cum	43	43
	≥350 cells/cum	57	57
	Total	**100**	**100**

Table 4: Prevalence of Blood and Nasal Eosinophilia in Allergic Rhinitis group

In 100 cases of allergic rhinitis patients 61% had nasal eosinophilia and 57% had blood eosinophilia.

		Frequency	Percentage
Nasal Eosinophilia	< 1 +	87	87
	≥ 1 +	13	13
	Total	100	100
Blood Eosinophilia	<350 cells/cum	77	77
	≥350 cells/cum	23	23
	Total	**100**	**100**

Table 5: Prevalence of Blood and Nasal Eosinophilia in Control group

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In 100 cases of control group patients only 13% had nasal eosinophilia and 23% had blood eosinophilia.

In this study sensitivity of blood eosinophilia is 57%, the specificity 77%, the positive predictive value 71.25% and the negative predictive value is 64.16%.

In this study sensitivity of nasal smear eosinophilia is 61%, the specificity 87%, the positive predictive value was 82.4% and the negative predictive value is 69%.

DISCUSSION: Allergic rhinitis is the commonest immunologic disease and is the one of the commonest chronic disease experienced by humans.

Atopy and parasitism are two important causes of eosinophilia. But etiology remains idiopathic in most patients

The mean age of patients in our study having Allergic rhinitis is 26.22, which is in accordance with the studies of Vervloet (1998)[1] 29 years, Darnell (1998)[1] 28 years, Bunnag (1998)[1] 30 years. One reason for this may be the lifestyle and activity in this age group, who are more active compared to older age group and children which will increase the chances of contact with a wide variety of allergens.

In this study male predominance was seen out of 100 allergic rhinitis patients 52% were male and 48% female and the 100 patients who did not have allergic rhinitis (control group) 58% were male and 42 % female. Male predominance was also observed by Bahram Mirsaid Ghazi, et al (2003),[2] Kemp A, Bryan Manchanda (1984).[3]

During the past 2 decades, considerable information has been obtained about the function of eosinophils and its role in human disease. Presently, the eosinophil is recognized as a pro-inflammatory granulocyte implicated in protection, and parasitic infestations are believed to play a major role in allergic diseases such as allergic asthma, allergic rhinitis, atopic dermatitis. Eosinophils normally account for only 1 to 3% of peripheral-blood leukocytes, and the upper limit of the normal range is 350 cells per cubic millimetre of blood. In allergic rhinitis eosinophils are found at higher levels both in peripheral blood and nasal tissue.[4]

The correlation between clinical allergy and nasal smear eosinophilia was first emphasized by Eyermann who reported a series of 92 cases with allergic rhinitis in which 72% was positive for eosinophils.[5] In the present study prevalence of nasal eosinophilia was found 61% in patients of allergic rhinitis and 13% in control group. Prevalence of nasal eosinophilia in other studies by different authors were Miri S (2006)[6] 62%, Losada Cosmes E (1984)[7] 59.5%, Miller RE(1982)[8] 69%, Abhey Sood (2005)[5] 80%, T Wakode(1989)[9] 77%, Sanil A et al (2006)[10] 57%. Out of the above mentioned studies, studies of Miri S(2006), Cosmes E(1984) and Sanil A et al well correlated with our study.

In our study prevalence of blood eosinophilia was 57% in allergic rhinitis patients and 23% in the control group which was similar to the study done by Rothenberg in 1998[4] in which prevalence of blood eosinophilia in allergic rhinitis patients was 59%. High degree of correlation between nasal allergy and eosinophilia was demonstrated by Sasaki et al.[5]

At 87% specificity of nasal smear test in our study was high and even higher was the finding reported by Hedaiat Al Akbari et al 96%, Miller et al,[8] Miri et al[6] 96%, and Akefah Ahmadiafshar et al[11] 90%. Study done by Orthai et al[12] found 100% specificity.

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On the other hand our finding of 61% sensitivity was similar to the studies of Miri et al[6] 62%, Orthai et al[12] 64.5%. But Akefah Ahmadiafshar et al[11] study showed higher sensitivity 74% than our study.They concluded that test is easy, noninvasive, and inexpensive, recommended it not only for the diagnosis of allergic rhinitis, but also for the differential diagnosis of a range of rhinitis disorders as well. Abhey Sood (2005)[5] study was also similar to our study with high specificity and moderate sensitivity.

Orathai et al (1998)[12] in his study found that none of the control subjects has eosinophil and basophilic metachromatic cell scores more than 0.5%. In their study they found nasal smear eosinophilia being 100% specific and 64.58% sensitive which along with consideration of basophil score of 0.5 reached to 100% specificity and 91.67% sensitivity. There by concluded eosinophil and basophil metachromatic cells in nasal cytology as a useful diagnostic test for allergic rhinitis.

Malmberg H[13] and his colleagues did nasal smear as a screening test for immediate type nasal allergy and found that a significant correlation was obtained between nasal eosinophilia and allergy.

In our study Positive predictive value of nasal smear test was 82.4% and Negative Predictive Value was 69%. Both of the figures are lower than what was reported by Akefah Ahmadiafshar et al.[11] But the study done by M. Crobach et al[14] Positive predictive value 81% was similar to our study but Negative Predictive Value 55% was higher than their study.

In view of the results of our study and many others discussed before, state nasal smear eosinophilia to be a highly specific and moderately sensitive test and as stressed by Miri et al[6] this highly valid test can be quickly and easily performed and read. And being an in-expensive test can be used to screen the patients of allergic rhinitis.

SUMMARY: Prospective study was done by dividing patients into 2 groups – 100 patients clinically diagnosed allergic rhinitis and 100 patients without having clinically allergic rhinitis. Both blood eosinophilia and Nasal smear eosinophila were tested.

Mean age of allergic rhinitis patients was 26.22 years

Allergic rhinitis was more common in males than females.

Prevalence of nasal eosinophilia was 61%.and blood eosinophilia was 57%.

Nasal smear sensitivity was 61% and specificity was 87%.

CONCLUSION: In our study it is observed that, a strong association of nasal smear eosinophilia with allergic rhinitis is present. This was in concordance with many other studies. The Nasal smear eosinophilia test being easy to use and inexpensive with high specificity and moderate sensitivity is recommended as a screening tool for allergic rhinitis.

Hence, nasal cytogram which is simple, economical and non-invasive procedure can be used as an alternative to invasive peripheral smear eosinophilia though both are equally efficacious in diagnosing allergic rhinitis disease.

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