

## Nasal Smear Eosinophil Count Vs AEC of Patients diagnosed with Allergic Rhinitis Attending a Tertiary Care Hospital & the Effect of Treatment with a Topical Steroid Nasal Spray on the Same

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**Abstract:** Allergic rhinitis being a heterogeneous disorder is often under-diagnosed despite its high prevalence. The age, sex, race or socioeconomic status has no bearing on those who get affected. It is one of the most common chronic conditions in the developed world with a significant impact on the quality of life. **Methodology:** 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 42 patients were thus included. **Statistical Analysis:** The baseline data was expressed as percentages & proportions. McNemar Chi square test & Paired t-test were applied for comparison between the two tests & for analyzing the pre-treatment & post-treatment values of nasal smear eosinophil counts & AEC. **Results:** Sensitivities of the tests were calculated as 40% & 54% for nasal smear eosinophil count & AEC respectively. The difference in sensitivities were found to be significant ( $p < 0.05$ ). The difference in the pre-treatment & post-treatment values of both nasal smear & AEC were found to be significant ( $p < 0.05$ ). AEC reduction was observed in 85.7% of the patients from the pre-treatment values & reduction in the nasal smear eosinophil counts were found in 28.6% of the patients.

**Key words:** AEC, Allergic rhinitis, Fluticasone nasal spray, Nasal smear eosinophil count

### I. Introduction

Allergic rhinitis being a heterogeneous disorder is often under-diagnosed despite its high prevalence.[1] The age, sex, race or socioeconomic status has no bearing with those who get affected.[2] It is one of the most common chronic conditions in the developed world with a significant impact on the quality of life.[3] The head and neck being the most common portal of entry of inhalants and food sensitizers is the region where the most common allergy induced diseases, such as rhinitis, sinusitis, otitis media, laryngitis and conjunctivitis occurs.[4,5] As the nose is usually the first site of hypersensitivity response the ENT department is frequently called upon to evaluate.[2] Most of the patients suffering from allergic rhinitis can be diagnosed by a combination of the history, clinical examination, skin prick test, radio-allergen sorbent assay for specific IgE levels and nasal smear for eosinophils.[5,6] Hence this study was conducted to evaluate the value of nasal smear eosinophil count as a simple non-invasive & inexpensive method for diagnosing allergic rhinitis & the effect of fluticasone nasal spray on local & systemic eosinophil counts

### II. Methodology

The study was conducted at our hospital over a period of 6 months from October 2012 to March 2013. 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 42 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.

#### 2.1 Inclusion Criteria

- i. Patients who have given consent to be a part of the study
- ii. Patients above 12 years of age with allergic symptoms
- iii. Patients who were not treated with topical steroid nasal spray in the past

#### 2.2 Exclusion Criteria

- i. All patients who did not give consent to be a part of the study
- ii. Patients below 12 years of age
- iii. Patients with a history of acute respiratory tract infections in the past month
- iv. Snuff users and pregnant women

v. Patients who were prescribed anti-histaminics within the past week

Following inclusion into the study, nasal smear eosinophil count & blood AEC (Absolute Eosinophil Count) 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.

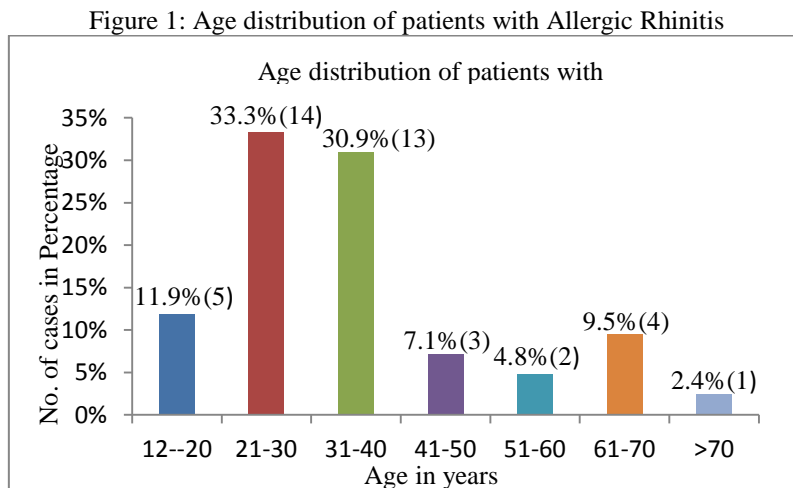
The patients were then prescribed with Fluticasone Propionate nasal spray for a month. They were advised to deliver 1 spray to each nostril twice daily (total measuring 200 micrograms/day) for a month. They were asked to return for follow up after a month & were advised to stop the medication 3 days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

**2.3 Statistical Analysis**

The data was entered into excel, cleaned, coded & transferred to SPSS. Statistical analysis was performed using SPSS V.16. The baseline data was expressed as percentages & proportions. McNemar Chi square test & Paired t-test were applied for comparison between the two tests & for analyzing the pre-treatment & post-treatment values of nasal smear eosinophil counts & AEC.

**III. Results**

Out of the 42 patients in this study, 57.1% of the patients presented with history of seasonal allergy, 19% presented with history of perennial allergy and the remaining 23.9% presented with mixed symptoms (i.e. both seasonal and perennial)



The figures in parenthesis are the actual number of cases

Majority of the patients belonged to the age group of 20-40 years (64.2%)

Table 1: Sex Incidence of Allergic rhinitis among the patients

Sex	Frequency (n)	Percent
M	26	61.9
F	16	38.1
Total	42	100

M:F ratio = 1.6:1

The incidence of allergic symptoms was more common among males (61.9%). Male:Female ratio was 1.6:1

Table 2: Frequency of signs & symptoms

Signs & Symptoms	Frequency	Percent
Rhinorrhoea	41	97.6
Nasal itching	29	69
Nasal obstruction	8	19
Pale mucosa	31	73.8
Sneezing	22	52.4

Rhinorrhoea (97.6%), pale mucosa (73.8%), nasal itching (69%) & sneezing (52.4%) was observed among majority of the patients.

Table 3: Nasal smea eosinophil count vs AEC

Nasal Smear	AEC Positive	AEC negative
positive	16	6
negative	8	12

McNemar Chi square test,  $p < 0.05$

Sensitivities of the tests were calculated to be 40% & 54% for nasal smear eosinophil count & AEC respectively. The difference in sensitivities were found to be significant ( $p < 0.05$ ).

Out of the 42 patients, with a history of allergic rhinitis 24 had raised AEC and 18 had normal AEC. 19 patients had raised nasal smear eosinophil count and the remaining 23 had normal nasal smear eosinophil count. Of the 24 patients with raised AEC, 17 had a raised nasal eosinophil count. Only 2 patients had raised nasal eosinophil counts with a normal AEC.

The patients were put on Fluticasone propionate nasal spray for one month and the investigations were repeated three days after stopping the treatment.

Out of 24 patients with raised AEC, the AEC of 3 (8%) patients became normal and of the 19 patients with raised nasal smear eosinophil counts, 5 (26.3%) patients' nasal smear eosinophil counts were normalized. The difference in the pre-treatment & post-treatment values of both the nasal smear eosinophil count & AEC, irrespective of whether the values were normal or abnormal, were found to be significant ( $p < 0.05$ ). AEC reduction was observed in 85.7% of the patients from the pre-treatment values & reduction in the nasal smear eosinophil counts were found in 28.6% of the patients. 88% of the patients were symptom free after 1 month of treatment and only 12% had persistence of symptoms even though in these patients, the severity and frequency had reduced.

#### IV. Discussion

We compared the sensitivity of the nasal smear eosinophil count with the AEC & the sensitivity of nasal smear eosinophil count was found to be quite low & the difference was found to be significant ( $p < 0.05$ ). Nasal smear eosinophil count is a non-invasive test & its usefulness in the detection of allergic rhinitis has been shown by various studies. In a study by Akefeh Ahmadi Afshar et al [7] the sensitivity was found to be 74% which was higher than those shown by Miri et al [8] & Miller et al [9]. But a specificity of 90% as shown by Akefeh Ahmadi Afshar et al [7] was similar to those of the latter two. The specificity of the tests could not be assessed in our study as we did not include subjects who were disease free. The reduction in the eosinophil counts both in the nasal smear eosinophil count & AEC was found to be significant after treatment with Fluticasone propionate nasal spray. The effectiveness of intranasal corticosteroid therapy in allergic rhinitis has been proven in controlled trials. [10] Treatment with fluticasone nasal spray rendered majority of the patients symptom free which corroborates well with earlier studies.

#### V. Conclusion

Nasal smear eosinophil count was not found to be a significant predictor of allergic rhinitis as AEC. The specificities & positive predictive values could not be assessed. The number of patients included in the study was limited as many of them were on treatment and had to be excluded. Further evaluation of nasal smear eosinophil count as a diagnostic test in the out-patient setting is necessary.

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