

Original research article

Comparative Study Between Nasal Smear Eosinophilia And Absolute Eosinophilic Count In Children With Allergic Rhinitis

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Abstract

Introduction: AR is the most common chronic disorder in the pediatric population with up to 40% of children affected. Confirmation of allergen as etiologic agent is difficult in a small setup, where IgE estimation and allergy tests are not accessible. **Aim:** to evaluate the value of nasal smear eosinophil count as a simple non invasive & inexpensive method for diagnosing allergic rhinitis and its correlation with blood absolute eosinophil count (AEC) in patients with allergic rhinitis (AR). **Method:** Prospective hospital based study of 100 allergic rhinitis pediatric patients. The study duration was 1 year from June, 2015 till May, 2016. Children who attended pediatric out patient department of Dr.B.R. Ambedkar Medical College and Hospital, Bangalore, Karnataka, with symptoms of allergic rhinitis were included. A total of 100 such children were taken into the study. **Results:** Seventy five percent subjects had eosinophils more than 10 cells/hpf [p = 0.03]. Correlation coefficient between nasal eosinophil and blood eosinophil was positive though weak [r=0.2, p = 0.04]. **Conclusion:** Nasal eosinophil count can be used as a weak predictor of blood eosinophil count and a strong predictor of allergic rhinitis.

Keywords: Eosinophil, allergic rhinitis, nasal, running nose

Introduction

Clemens Vonpirquet coined the term allergy from Greek "allos" meaning "others" and "ergon" meaning reaction to describe hypersensitivity reaction in 1906. Allergic rhinitis is an IgE mediated hypersensitivity disease of mucous membrane of nasal airway characterized by sneezing, itching, watery nasal discharge and sensation of nasal obstruction. Allergic respiratory diseases are very common in pediatric patients. Allergic rhinitis and asthma are two common allergic diseases of respiratory tract.¹

Allergic rhinitis being a heterogeneous disorder is often under-diagnosed despite its high prevalence. Data suggests that AR is the most common chronic disorder in the pediatric population with up to 40% of children affected. It is one of the most common chronic conditions in the developing world with a significant impact on the quality of life.

AR affects the quality of sleep in children and frequently leads to day-time fatigue as well as sleepiness. It is also thought to be a risk factor for sleep disordered breathing. AR results in increased school absenteeism and distraction during class hours. Allergic rhinitis involves inflammation of the mucous membranes of the nose, eyes, eustachian tubes, middle ear, sinuses, and pharynx. Allergic rhinitis is associated with eosinophilia either in blood or tissue or both.²

Most of the patients suffering from allergic rhinitis can be diagnosed by a combination of the history, clinical examination, skin prick test, radio-allergosorbent assay for specific IgE levels and nasal smear for eosinophils. There is mounting evidence that eosinophils are implicated in pathophysiology of allergic respiratory diseases. The direct and easy access of airborne allergens and irritants to the airways, stimulate mast cells to produce IgE and cytokines which serves as enhancing factors for eosinophilic infiltration in allergic diseases. 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.

Confirmation of allergen as etiologic agent is difficult in a small setup, where IgE estimation and allergy tests are not accessible. The normal nasal eosinophil percentage was 0-6% (<10) while the normal absolute eosinophil count is considered to be <450 cells/microlitre.³⁻⁵ This study was conducted to evaluate the value of nasal smear eosinophil count as a simple non invasive & inexpensive method for diagnosing allergic rhinitis and its correlation with blood absolute eosinophil count (AEC) in patients with allergic rhinitis (AR)

Methodology

This was a prospective hospital based study of 100 allergic rhinitis pediatric patients. The study duration was 1 year from June, 2015 till May, 2016. Children who attended pediatric out patient department of Dr.B.R. Ambedkar Medical college and Hospital, Bangalore, Karnataka, with symptoms of allergic rhinitis were included. A total of 100 such children were taken into the study.

Inclusion criteria:

All children aged 2 to 18 yrs with signs and symptoms of allergic rhinitis as noted in a proforma specially designed for the study.

Exclusion criteria:

Children with TB, recurrent and chronic pneumonia, malignancy, collagen vascular disorders and those who are on oral/nasal steroid therapy were excluded from the study.

Method of data collection:

Nasal Smear Preparation : Nasal secretion was collected by asking the child to blow his nose into a plastic wrap and then placed on a glass slide. If he was too young to do this or insufficient secretion was obtained, cotton tipped swab was inserted into a nostril and left for 60 seconds. The nasal secretion which was obtained was transferred onto a glass slide, teased out and allowed to air dry. The normal nasal eosinophil percentage was 0-6% (<10).

Blood sampling: With strict aseptic precautions, blood sample was drawn by venepuncture and 3 ml of blood was collected in Ethylene Diamine Tetra Acetic Acid (EDTA) anticoagulant. The sample collected was subjected to Absolute eosinophil count (AEC).the normal absolute eosinophil count is considered to be <450cells/microlitre.

Results:

In the index study, most common age group was 6 to 10 years [49%], followed by 11-15 years [26%], more than 15 years old 15% and the remaining belonged to less than 5 years old. [p <0.05]. Mean age of the patients was 10.2 ± 2.97 .

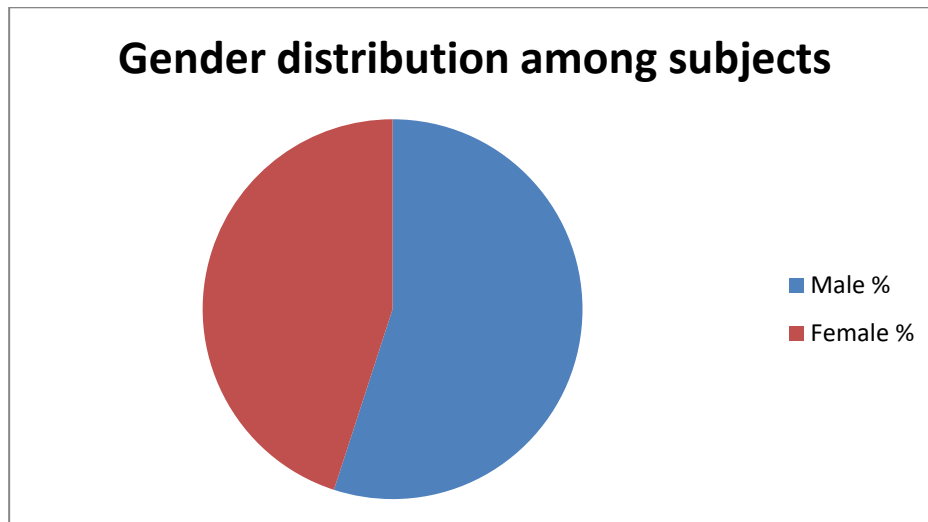


Figure 1: Gender distribution of Subjects

Children in the age group 6-10 years old showed the highest incidence of allergic rhinitis, with incidence of 53%. [males 49%, females 51%]. We assessed the common risk factors among the subjects and found them as follows, seasonal variation 52%, pollen 37%, family history 6% and animal allergen 5%.

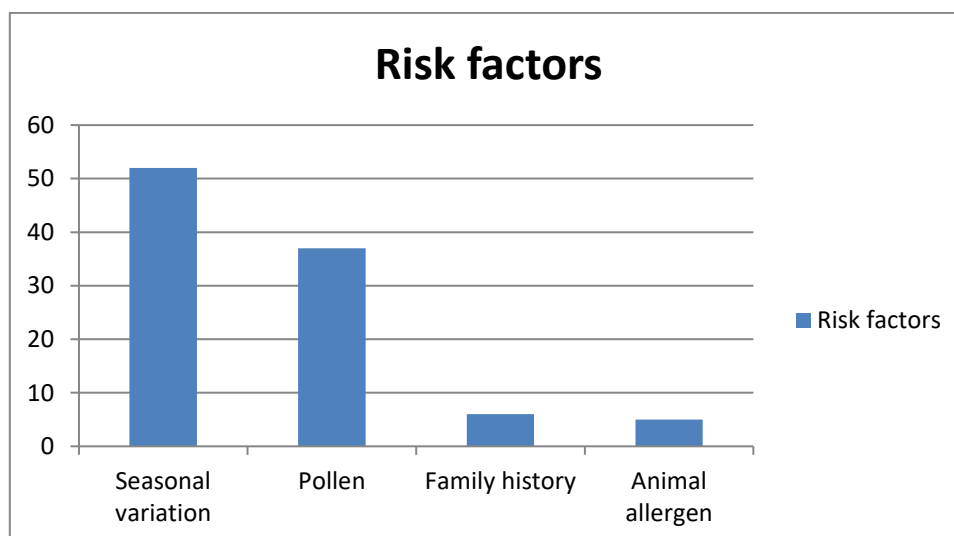


Figure 2: Risk factors for allergic rhinitis

Most common presenting complaints of the subjects were running nose 80%, nasal obstruction 75%, itching/sneezing 70%, epistaxis 10% and cough 30%. Bronchial asthma was the most common comorbidity encountered among subjects.

We took 10 eosinophils per high power field as the cut off for eosinophil count. Seventy five percent subjects had eosinophils more than 10 cells/hpf [$p = 0.03$]. Correlation coefficient between nasal eosinophil and blood eosinophil was positive though weak [$r=0.2$, $p = 0.04$].

Table 1: Common symptoms among subjects

Symptom	N [%]
Running nose	80 [80]
Nasal obstruction	75 [75]
Nasal itching/sneezing	70 [70]
Epistaxis	10 [10]
Cough	30 [30]

Discussion

Allergic rhinitis is a common disorder in children visiting OPD in clinical practice. With appropriate history and clinical examination diagnosis of allergic rhinitis is simple. Routine investigation may not contribute much for the diagnosis. To confirm the allergic nature of the disease, complicated tests like, skin hypersensitivity test, Radio allegro sorbent test, (RAST), enzyme-linked immunosorbent assay (ELISA), IgE assay may be necessary, which are practically not feasible in all patients. Hence this study tries to find the feasibility of the nasal eosinophil count over the blood eosinophil count in allergic rhinitis children.

In the study there was almost equal gender distribution of allergic rhinitis, which was also found in the study by Venkateswarlu V et al⁶ Seasonal variation was the most common risk factor followed by pollen allergen. Among risk factor food allergy was statistically not significant. The study by Pokharel PK et al, (6-12%) also showed the similar result.⁷

Among all the children, running nose was the most common symptom accounting for 80% of cases followed by nasal obstruction. Similar results were seen in the study by Shetty SS et al and Kumar N et al.^{8,9} Nasal eosinophil and blood eosinophil count was done in all cases and nasal eosinophil count of >10 cells/hpf is consider positive as per IAP recommendation. Many studies have taken different cut off values. Crobach M et al, have considered >10 cells/hpf as significant similar to the present study.¹⁰ Similarly, Chowdary VS et al, considered blood eosinophil count of >440 cell/mm³ is considered as significant and this cut off value.¹¹

In present study also blood eosinophil count of >440 cell/mm³ is considered as significant. Various studies have found various results for nasal smear eosinophilia ranging from 18.0% to 80.0%. Similar results were found in the study conducted by Sanil A et al, and Kumar N et al, where there was nasal smear eosinophilia of 57%.¹²

Conclusion:

Children presenting with nasal discharge, nasal obstruction or itching/sneezing should be evaluated for allergic rhinitis. Nasal eosinophil count can be used as a weak predictor of blood eosinophil count and a strong predictor of allergic rhinitis.

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