

# Association of Nasal Polyposis with Peripheral Blood Eosinophilia and Fungal Infection (A Tertiary care experience)

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## ABSTRACT

**Aim:** To determine the association of nasal polyps with peripheral blood eosinophilia and fungal infection.

**Study design:** Descriptive cross sectional study.

**Place and duration of study:** Pathology Department of King Edward Medical University Mayo Hospital Lahore from July 2015 to December 2015.

**Methodology:** Total of 50 biopsies of nasal polyps/ mass were studied. Reports of complete blood counts were collected from investigation records of patients to check eosinophil count in peripheral blood before surgery. Histological slides of each patient presenting with nasal polyps were reported by the consultant pathologist and fungus present was identified as allergic fungal mucin which are tigroid sheets of eosinophils and fungal debris (local or diffuse) and blood report was collected to check the eosinophil count (more than 5 was taken as eosinophilia). The study was conducted for six months from August 2015 to December 2015. Collected data was analyzed through computer software SPSS 16.0. Mean and standard deviation were calculated for quantitative variables i.e. age, eosinophilic count and fungal infection.

**Results:** There were 50 patients with age range of 11-60 years. Mean age was  $27 \pm 13.4$ . There were 26 (52%) females and 24 (48%) males. The males were on the average distributed in all age groups majority of females were in age group 12-30 years (84.6%). Regarding association between allergic nasal polyp and eosinophilic count significant association ( $p=0.04$ ) was noted. The strength of association between these two factors was 30% by contingency coefficient ( $p=0.26$ ). Histologically fungus was diagnosed as allergic fungal mucin (tigroid sheets of eosinophils and fungal debris) in 10 (20%) cases and rest 40(80%) were free of fungal infection. Patient's history of allergy like sneezing, rhinorrhoea, itching were also noted. Allergic symptoms were reported in 37(74%) while 13(26%) had no such history. Only 8 (16%) of patients of nasal polyps showed peripheral eosinophilia.

**Conclusion:** Nasal polyps are more common in females than males. The minimum age is 12 years and maximum age for presentation of nasal polyps is 60 years. Fungal infections are also associated with polyp formation. Allergic nasal polyps are more common than non allergic nasal polyps. Peripheral blood eosinophilia has poor association with nasal polyps.

**Keywords:** Allergic fungal mucin, Allergy, Eosinophilia, Fungal infection, Nasal polyps.

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## INTRODUCTION

Nasal polyps (NP) are edematous protrusions of nasal mucosa still being attached with stalk. They originate usually near ethmoidal sinus. They may reach upto 3-4cm in size<sup>1</sup>. Recurrent attacks of rhinosinusitis result in polyp formation<sup>2</sup>. Allergic rhinitis is initiated by allergies to environmental allergens. It is associated with raised serum IgE levels and increased eosinophilic count in peripheral blood<sup>3</sup>. Non-allergic rhinitis that causes nasal polyps is usually due to repeated attacks of acute rhinitis in patients with normal IgE levels and eosinophilic count<sup>4</sup>. These polyps are easily accessible for histological and immunological studies to find the

causative factor<sup>5</sup>. Whether allergy is only aetiological factor for nasal polyposis is still controversial<sup>6</sup>.

Allergic nasal polyposis is diagnosed histologically by edematous mucosa and stroma infiltrated by inflammatory cells predominantly eosinophils along with few neutrophils and lymphocytes<sup>7</sup>. Some of these patients have associated fungal infection of nasal mucosa, which can be seen histologically and is called allergic fungal sinusitis. It is common in children and adults<sup>8</sup>. Nasal polyposis unassociated with allergies or fungal infection is mostly seen in middle aged people. Histologically these polyps are infiltrated by neutrophils, lymphocytes and plasma cells. Eosinophils are not predominantly present in these polyps<sup>9</sup>.

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Several haemopoietic and pro-inflammatory cytokines (GM-CSF, IL-6, IL-8, SCF), capable of recruiting and activating mast cells and eosinophils, are upregulated in various tissue compartments (epithelium, stroma) of nasal polyps. The inflammatory cells themselves, especially eosinophils, are rich sources of many cytokines which are capable of inducing their own differentiation and activation in an autocrine fashion<sup>10</sup>. This results in production of IgE, inflammatory cytokines and recruitment of mast cells and helper T cells<sup>11</sup>. Clinical features of hypersensitivity are caused by mediators released from mast cells and eosinophils. It can be stated that nasal polyps can be looked upon as a type of self-perpetuating inflammatory process<sup>12</sup>.

The purpose of my study was to study whether nasal polyposis has association with peripheral blood eosinophilia or not. This will help in diagnosing or atleast suspecting allergic causes of polyposis in these patients. This study might help in segregating patients as allergic and non allergic polyposis on complete blood count which could guide clinician to treat them early because they have different methods of treatment including antihistamines, steroids, immunotherapy and antifungals. Peripheral blood eosinophilia is non invasive diagnosing technique and can help in management of patients if any association is found in this study.

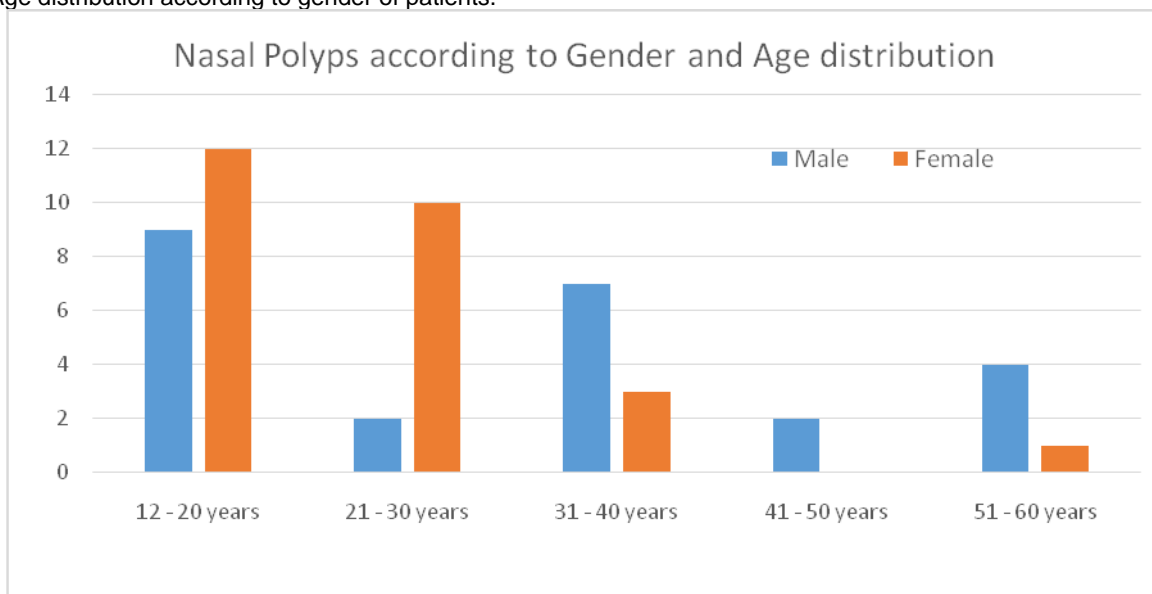
**Methodology:** The study was carried out in the histopathology section of Pathology department of King Edward medical university Mayo hospital Lahore from. Total of 50 biopsies of nasal polyps/ mass were studied. Reports of complete blood counts were

collected from investigation records of patients to check eosinophil count in peripheral blood before surgery. Histological slides of each patient presenting with nasal polyps was reported by the consultant pathologist and blood report was collected to check the eosinophil count (more than 5 was taken as eosinophilia). The study was conducted for six months from July 2015 to December 2015. Collected data was analyzed through SPSS 16.0. Mean and standard deviation was calculated for quantitative variables i.e., age, eosinophilic count and fungal infection. Frequency and percentage were calculated for quantitative variables. The association between serum eosinophils and nasal polyps was observed by using correlation coefficient.

## RESULTS

There were 50 patients with age range of 11-60 years. Mean age was  $27 \pm 13.4$ . There were 26 (52%) females and 24 (48%) males. The males were on the average distributed in all age groups majority of females were in age group 12-30 years (84.6%). Age distribution in both sexes is given in figure I. ( $p=0.26$ ). Histologically fungus was confirmed as allergic fungal mucin in 10(20%) cases and rest 40(80%) were free of allergic fungal mucin. Patient's history of allergy like sneezing, rhinorrhoea, itching were also noted. Allergic symptoms were reported in 37 (74%) while 13(26%) had no such history. Only 8 (16%) of patients of nasal polyps showed peripheral eosinophilia. The strength of association ( $p=0.04$ ) between allergic nasal polyp and eosinophilic count was 30% by contingency coefficient

Fig. I: Age distribution according to gender of patients.



**DISCUSSION**

A study conducted by Segal N(2010) in Israel on pediatric population with nasal polyps showed minimum age of patients being 14 years old<sup>13</sup>. Whereas in our study the minimum age of presentation of nasal polyps is 12 years. This earlier age of presentation could be due to environmental pollution more in our country. Aaron N et al. (2010) in a study conducted at western reported that the average age of NP is between 40 and 60 years of age<sup>14</sup>. While in our study average age of presentation of nasal polyps is 27 years. This also shows earlier presentation than western population.

Leif Johansson et al. (2003) in a study, conducted on 1,900 subjects in Sweden, reported that the prevalence of nasal polyps was 2.7% (95% confidence interval, 1.9-3.5), and polyps are more frequent in men (2.2 to 1), the elderly (5% at 60 years of age), and asthmatics<sup>15</sup>. Whereas in our study the frequency of nasal polyps is greater in females than in males (females 52%, males 48%). Aaron N et al. (2010) found weak association between NP and allergic rhinitis<sup>16</sup>. While in our study the frequency of allergic nasal polyps is greater than non allergic nasal polyps (allergic NP 74% and non allergic 26%). This also points towards environmental or genetic factors responsible for NP in our population. Kakli HA (2016) reported secretion and tissue eosinophilia in 88% of the patients, whereas correlation with blood eosinophilia was poor (30%)<sup>17</sup>. Alike in our study, the correlation of blood eosinophilia with nasal polyps is also poor (16%).

London Nr JR (2016) in a study found that fungal elements were found on histology in 82% of chronic rhinosinusitis patients undergoing sinus surgery<sup>18</sup>. While in our study the association of fungal infection with nasal polyps is 20%. This is very low as compared to study conducted by London Nr JR. This might indicate that we have lower fungal infection rate than western population. We can conclude that in our population environmental allergens or atopy has more association with nasal polyps.

**CONCLUSION**

We conclude that blood eosinophilia is not strongly associated with NP. However, minimum age of presentation, fungal infections, presence of allergy and gender predisposition is remarkably different from western population. These factors should be studied more to know exact cause of NP formation. In our society, we need a larger sample to look for the causes responsible and factors associated with NP formation.

**RECOMMENDATIONS**

We recommend larger study groups to know the allergens and causes present around us which cause nasal polyp formations, so that we should minimize the causes of polyp formation. There should be early diagnosis and management regarding nasal polyps. Peripheral blood films should not be considered effective tool for diagnosing allergy or associated fungal infection. Government and health organization should take steps to increase awareness among people about risk factors and outcomes of polyps, because these can be complicated if present for long time.

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