

Asian Nasal Polyps: A Separate Entity?

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SUMMARY

Objective: To determine the pattern of cellular infiltration in nasal polyposis among Malaysian population and to compare the pattern of cellular infiltration in nasal polyposis between Malaysian and other Asian countries.

Material and method: This is retrospective study done on patients diagnosed with nasal polyposis from January 2008 to June 2012 in University Malaya Medical Center. Only the patients undergoing first operation for nasal polyp and were confirmed polyp with histopathological sections were included in the study.

Result: A total of 80 subjects were included in the study. Of these 48.75% had neutrophil- predominant polyp which was in contrast with the eosinophil- predominant polyp of Caucasian population but similar to other studies done in Asian countries.

Conclusion: The etiology of nasal polyposis in Caucasians and Asians may be different and may need to be managed differently. It may be more appropriate to treat nasal polyposis in Asian population with long term antibiotics and more study needs to be done on this.

KEY WORDS:

Nasal Polyps, Classification, Neutrophil Predominant

INTRODUCTION

Nasal polyp is a chronic inflammatory disease of the mucous membrane in the nose and paranasal sinuses, and characterized by edematous masses of inflamed mucosa. Most polyps originate from the clefts in osteomeatal complex¹ and extend into nasal cavity, leading to nasal obstruction, secretion, anosmia, headache and reduced quality of life². In general population, the overall prevalence rate of nasal polyps in adult ranges from 1 to 4 %³. The prevalence rate is much lower in children except when associated with cystic fibrosis.

Nasal polyp is a multifactorial disease, with infectious and non infectious inflammation and genetic abnormality. Several theories have been proposed to explain the pathogenesis of nasal polyp⁴. Although most of the polyps in the past were found to be eosinophil- predominant, recent studies¹¹⁻¹³ in some Asian countries showed that Asian population has neutrophil- predominant polyps.

They postulated that the mechanism of polyp formation could be different in Asian population and may need a

different therapeutic approach. The objective of this study was to determine the pattern of cellular infiltration in Malaysian population and compare with other studies done in Asian countries.

MATERIALS AND METHODS

This was a retrospective study done on patients who were diagnosed with nasal polyposis from January 2008 to June 2012 in University Malaya Medical Center. The diagnosis of nasal polyp was made from history and clinical examination including endoscopic examination and computed tomography scan. Only those patients who underwent first operation for nasal polyposis were taken in study.

Patients who had recurrence of nasal polyp or were not confirmed nasal polyp on histological examination were excluded from the study.

The histology of each polyp was seen in details. The different types of cells were identified and pattern of cellular infiltration determined. The predominant cellular type was identified and classified as neutrophil- predominant (more than 50% cells were neutrophils), eosinophil- predominant (more than 50% cells were eosinophils).

RESULTS

A total of 97 subjects were diagnosed with nasal polyposis on clinical and radiological ground that underwent operation from January 2008 to June 2012.

In 17 subjects the final histological diagnoses was not polyp and were excluded from the study.

Of the 80 subjects included in the study 48 were male and 32 female. The age range of patients was 12 to 72 with mean age of 64. Eosinophil- predominant polyp was seen in 51.25% of patients and 48.75% had neutrophil- predominant polyp. The result is summarized in table I.

DISCUSSION

Nasal polyposis involves a complex inflammation that is regulated by various chemical mediator and cytokines produced by inflammatory and the structure cells in the nasal mucosa. Investigation of the changes in the inflammatory cell population in nasal polyp will provide essential information on the pattern of local inflammation and it related pathologic mechanisms.

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Table I: Distribution of eosinophil-predominant polyp and neutrophil-predominant polyp

	Male	Female	Total	%
Eosinophil predominant	21	20	41	51.25%
Neutrophil predominant	27	12	39	48.75%

Based on the histological findings, Hellquist HB (5) classified polyps into four types 1) Eosinophilic edematous 2) Chronic inflammatory 3) seromucinous 4) Atypical stromal

The general histopathological classification of nasal polyp is eosinophil- dominant or neutrophil- dominant inflammation⁶.

Although many theories have been suggested, the roles of allergy and infection remain the most important and controversial underlying mechanisms in nasal polyp and chronic sinusitis. In addition, although the two diseases are concomitant in many patients, the pathogenic mechanism interlinking these two common nasal diseases is still incompletely understood.

Jing Hao did a study in Singapore¹³ and showed that pattern of inflammatory cell infiltration in nasal polyp and middle turbinate is similar suggesting a diffuse pattern of mucosal inflammation. So a continued application of medical treatment is necessary to control the adjacent mucosal inflammation and prevent recurrence of nasal polyp post operation. Eosinophil infiltration has been commonly believed to be a distinctive characteristic of nasal polyp. This is seen in 60-90% of cases⁷⁻¹⁰. The pathogenic mechanism has been explained by increased transendothelial migration and inhibition of programmed cell death of eosinophils. However, whether an increase of eosinophils is a unique or key pathological condition of nasal polyposis or whether it involves other inflammatory cell types has not been well characterized previously.

Several theories have been proposed to explain the pathogenesis of nasal polyp (4):

Allergy: allergy has been implicated as a cause of nasal polyposis as most of the polyps were eosinophilic and were associated with asthma.

Mucosal allergy: it has been postulated that non-atopic individual has local Ig E mediated mucosal response.

Vasomotor imbalance: this theory implied that most of the patients with nasal poly are non- atopic but have symptom of rhinitis prior to formation of polyps. Also nasal polyp has been found to lack vasoconstrictor innervations and increased vascular permeability causing polyp.

Bernoulli phenomenon: there is pressure drop next to constriction which sucks the mucosa of narrow site like contact between two mucosal surfaces.

Cystic fibrosis: The increased sodium absorption and decreased chloride secretion result in net movement of water in to cell and interstitial space, leading to water retention, polyp formation and dehydration of secretion.

Nitric oxide free radical damage: increased level of nitric oxide has been found in nasal polyposis and free radical damage as a cause of nasal polyposis has been suggested.

Infection: bacterial infection causing epithelial damage and polyp formation has been postulated.

Super antigen: staphylococcus aureus has been isolated from nasal polyp. They produce enterotoxins which act as super antigen which activate inflammatory cells leading to polyp formation.

Epithelial rupture theory: Rupture of epithelium of nasal mucosa from allergy or infection can lead to prolapse of the lamina propria mucosa, forming polyps. The defects possibly are enlarged by gravitational effects or venous drainage obstruction.

Aspirin intolerance: Samter's triad a distinct clinical syndrome, characterized by nasal polyposis, the precipitation of rhinitis and asthma attacks by aspirin and most of other nonsteroidal anti-inflammatory drugs.

Fungal infection: histopathological examination of nasal polyp has revealed fungal element in many nasal polyps.

Genetic: nasal polyposis is common in cystic fibrosis and Samter's triad which have genetically mediated.

Kartegener syndrome, Young syndrome, Primary ciliary dyskinesia is associated with nasal polyps.

In the literature most histological studies of nasal polyp has been performed in Caucasian patients, and data from Asian population is still lacking. The more common histological type is eosinophil- predominant inflammation. Except in cystic fibrosis and primary ciliary dyskinesia, in majority of the nasal polyps eosinophils comprised 60-90% of cell population⁷⁻¹⁰.

However although the incidence of cystic fibrosis and primary ciliary dyskinesia is rare in Asian population, study done in Sriraj hospital Thailand showed that 81.9% of nasal polyp had neutrophil- predominance pattern¹¹ This was supported by study done by Nan Zhang in China¹² and Jing Hao in Singapore¹³. They suggested that pathological mechanism may be different for Asian population.

Our study also showed that in Malaysian population the neutrophil- predominant polyps accounts for 48.75%. This is in contrast with Caucasian where 80-90% of polyps are eosinophilic. The mechanism of polyp formation may be different in Asian population in contrast to Caucasian population. So a different therapeutic approach may be required for treating the nasal polyposis in Asian patients.

The use of steroid used to treat nasal polyposis may not be enough in Asian polyps and may need long term antibiotic therapy. There are several studies which show the role of macrolides in both atopic and non-atopic individual. They have anti-inflammatory and immunomodulatory effect. World Allergy Organization (Global Resources in Allergy) recommended use of antibiotic in nasal polyposis¹⁴. They suggested nasal polyposis is a complex disease and few aetiological answers are known. Nasal polyps are associated with chronic rhinosinusitis and treating underlying sinusitis is important. Considering the high percentage of neutrophilic polyp in Asian population long term use of antibiotic may be more appropriate and further studies needs to be done on this.

CONCLUSION

Our study supports the finding of the nasal polyp study done in other Asian countries like China, Thailand and Singapore where neutrophil-predominant polyp occur in large percentage of patients(49%). The etiology of nasal polyposis in Caucasians and Asians may be different and may need to be managed differently. It may be more appropriate to treat nasal polyposis in Asian population with long term antibiotics and more study needs to be done on this.

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