DOI: 10.14260/jemds/2014/3285

ORIGINAL ARTICLE

A RETROSPECTIVE OBSERVATIONAL STUDY OF USEFULNESS OF HISTOPATHOLOGICAL EXAMINATION IN SINO NASAL POLYPS

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HOW TO CITE THIS ARTICLE:
V. Krishna Chaitanya. "A Retrospective Observational study of usefulness of Histopathological Examination in Sino Nasal Polyps". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 39, August 28; Page: 9918-9926, DOI: 10.14260/jemds/2014/3285

ABSTRACT: INTRODUCTION: Sino nasal polyps are a multifactorial disease with varied etiology. Till date etiology of nasal polyps is unclear and no single theory adequately explains the etiology. **OBJECTIVES:** To study clinically the etiology of sino nasal polyps. To confirm the diagnosis of sino nasal polyps by histopathology. **MATERIALS AND METHODS:** Data was analyzed in patients of sino nasal polyps with clinical History and anterior rhinoscopy was performed. All these patients with sino nasal polyps were investigated with total serum IgE, Absolute eosinophil count and Skin prick test. These polyps were excised by FESS and the excised specimen was sent for Histopathological examination. Exact nature of sino nasal polyps and final diagnosis was given after Histopathological confirmation. **CONCLUSION:** 1. Etiology of sino nasal polyp is to be confirmed by clinical investigations of total serum IgE, Absolute eosinophil count and Skin prick test. 2. Total serum IgE, Absolute eosinophil count and Skin prick test help in the clinical diagnosis of sino nasal polyps. 3. Histopathological confirmation is a must to know the exact nature of sino nasal polyp.

KEYWORDS: Sino nasal polyp, Total serum IgE, Absolute eosinophil count, skin prick test, Histopathology.

INTRODUCTION: Sino nasal polyps are a multifactorial disease with infectious, noninfectious inflammation, anatomic, and genetic abnormalities. The etiology of Sino nasal polyps remains unclear and currently no single theory adequately explains the formation of sinonasal polyps. Allergy has been implicated in the etiology in majority of nasal polyps as they have eosinophilia and the nasal findings that may mimic allergic symptoms and signs. (1)

When these nasal polyps were analyzed there is an increased inflammatory cell infiltration, increased expression and production of a variety of pro inflammatory cytokines and chemokines have been observed. Increased levels of IL-8 can induce neutrophil infiltration. It was observed that serum IgA and IgE are also increased in nasal polyps. (2)

In an analysis of nasal mucosa in sino nasal polyposis it reveals that along with eosinophil mast cells and plasma cells are also increased compared with normal nasal mucosa. Literature on sino nasal polyposis states that total serum IgE appears to be elevated in sinonasal polyps.(3)Exact nature of diagnosis in nasal polyps is arrived by a battery of investigations which include nasal endoscopy, serology, skin prick test, radiology and histopathology.(4)

Presently there were no definite histological criterion for differentiation of allergic from inflammatory polyp but tissue eosinophil count with goblet cells, allergic mucin with edema and Seromucinous glands are suggestive of allergy.(5)

If thick, inspissated nasal secretion is seen in association with polyps then the possibility of a fungal infection should immediately be suspected. It is important that all polyp tissue removed surgically should be submitted for histological examination to find the exact nature of the polyps.

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OBJECTIVES:

1. To study clinically the etiology of sino nasal polyps.
2. To confirm the diagnosis of sino nasal polyps by histopathology.

Review of Literature: Clinical recognition of nasal polyps as a troublesome disease could be assessed by the fact that it has been recorded in Indian scriptures as far back as 1000B.C. Even though Indian scripture descriptions of the nasal polyps precede Hippocrates by several centuries, Hippocrates has been very widely recognized as "Father of Rhinology".

In fact, Hippocrates "sponge method" of polyp removal has found its way into medical text books.[6] Categorization of nasal polyps into different groups based on the site of origin was started by Killian (1906). He was first to describe it as "Antrochoanal polyp". Fairbanks classified them into two groups as antrochoanal and multiple ethmoidal polyps.

A review of literature reveals diverge views regarding the origin of nasal polyps. Larson PL et al stated that Ethmoid sinus is the commonest site of origin. According to them the nasal polyps originated from nasal mucosa. But endoscopically, Stamberger H has demonstrated that almost all polyps that appear in the nasal cavity are from Ethmoid sinuses.[7]

MATERIALS AND METHODS:

Source of Data: A retrospective analysis of the data obtained from a study population of 46 patients with sinonasal polyps, who presented in the Department of ENT, Kamineni Institute of Medical sciences, Narketpally during June 2008 and September2009 were included.

Inclusion Criteria: Patients presenting with sino nasal polyposis in one or both nostrils were included.

Exclusion Criteria: Patients presenting with congenital sino nasal mass, sino nasal mass of intracranial origin such as basal meningocoele, basal meningoencephalocoele, and nasal glioma were excluded.

Method of collection of data: After obtaining a written, informed consent from the patient or attendants for the treatment and follow up, a detailed history with a Clinical questionnaire was obtained from all the patients with nasal polyps. Depending on the clinical features, history, anterior rhinoscopy was performed to identify sino nasal polyps.

Interventions: Diagnostic nasal endoscopic examination was performed in all the patients to confirm the origin and extension of sino nasal polyp. All the patients with sino nasal polyps were investigated with total serum IgE and Absolute eosinophil count. CT PNS was performed in all the patients to rule out sino nasal masses of intra cranial origin. History of association of nasal polyp with asthma and aspirin sensitivity was considered.

Skin prick test was performed in all the patients with sino nasal polyps with allergen extracts with histamine and normal saline as control. In all these patients with sino nasal polyps, the polyps were excised by Functional Endoscopic sinus surgery.

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The excised specimen obtained was sent for Histopathological examination. Exact nature of sino nasal polyps and final diagnosis was obtained only after Histopathological confirmation.

Histopathological Examination: All surgically excised sino nasal polyps were investigated with Histopathological examination. Haematoxylin and eosin stains were used for all sections in Histopathological examination. Other special stains were used when required to know the exact nature of sino nasal polyps.

Main outcome Measures: Clinically sino nasal polyps were grouped based on the site of origin as antrochoanal and ethmoidal polyps. Also based on clinical presentation and serological examination polyps were grouped as allergic if along with clinical history of allergy, there was an elevated level of absolute eosinophil count, total serum IgE and positive skin reactions in skin prick test. If at least three of the parameters mentioned were positive, it was considered that the etiolgy of sino nasal polyp could be allergic clinically.

Based on histopathology sino nasal polyps were grouped as Allergic and non-allergic or inflammatory nasal polyps. It was observed from the study that in the group of allergic polyps Eosinophil dominated inflammation, allergic mucin, goblet cell hyperplasia, hypertrophy of glands were observed in most cases on histopathology suggestive of allergy.

If along with a clinical history of allergy, if at least two histological parameters of allergy were elevated then a diagnosis of allergic polyp can be deduced. However it was by Histopathological examination the exact nature of sino nasal polyp can be obtained where a change in diagnosis of polyp can be a possibility.

RESULTS: In this study the age range of nasal polyps ranged from 9 to 64 years. In ethmoidal polyps, the maximum numbers of 8 (28.57%) patients were in the age group of 31 to 40 years. Antrochoanal polyps were seen in 16 patients (90.0%) in the age group of 11 to 30 years. Males dominated with 31numbers of cases (67.39%). Ratio of male: female in our study is 2.07:1. Bilateral ethmoidal polyps were more in numbers in 28(60.88%) patients. Antrochoanal polyps were unilateral and more on the right side in 11 (23.91%) patients.

Clinically symptoms of nasal obstruction were observed in 43 (93.47%) of patients of sino nasal polyps followed by discharge from the nose in 28(60.88%) of patients. Sneezing was seen in 27 (58.69%) of patients. Endoscopically allergic mucin was seen in 24 (52.17%) patients. Cheesy debris was seen in 4 (8.70%) of patients. Pale mucosa was seen in 18 (39.13%) of patients. Multiple polyps were seen in 28(60.87%) patients.

It was observed in this study that serological investigations of Absolute Eosinophil Count was elevated in 37(80.43%) of patients. Total serum IgE was elevated in 32(69.67%) of patients. All the patients with sino nasal polyps were investigated with skin prick test. It was observed that Skin prick test was positive in 17 patients of sino nasal polyps (37.0%).

In the present study Histopathological examination of the specimen revealed that in patients of sino nasal polyps Ciliated epithelium was seen in 27(58.70%) of patients, columnar epithelium in 15(32.60%) of patients and squamous metaplasia in 11(23.91%) of patients. Histologically Mucin was seen in 23(50.0%) of patients and fungal hyphae in 1(2.17%) patient. No Charcot laden crystals were observed on histopathology in any of the specimen.

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Goblet cell hyperplasia was seen in 21(45.65%) of patients, hypertrophy of glands in 20(43.48%) of patients. These results were analysed in table 1.

Histopathological examination of the excised polyp specimen in this study revealed Eosinophils in 46(100.0%) patients. Other cells like neutrophils, lymphocytes were elevated in 26(56.52%) of patients with neutrophils dominating the field. In the study performed it was observed that Eosinophils were 3+, 4+ grades in 41(89.13%) patients, labelled as eosinophil rich.

These results were documented in table 2.

By clinical examination and serological investigations of the study data, a diagnosis of allergic nasal polyp was made in 24(52.17%) and the remaining 22(47.83%) patients were diagnosed as having non-allergic or inflammatory polyps**.**These results were documented in table 3.

When these specimen were excised and investigated with histopathology 22(47.83%) patients were diagnosed as having allergic nasal polyps and 24(52.17%) of patients were diagnosed as having inflammatory polyps of which 2 patients presented with capillary hemangioma secondary to polyp, 1patient presented with inverted papilloma and 1 patient had tuberculous nasal polyp.

On Histopathological examination only 1 patient was reported having sino nasal polyp with fungal elements. Analysis of this data revealed that there was a change in diagnosis of sinonasal polyps by Histopathological examination in 4(8.70%) of patients.These results were documented in table 3.

In this study when the results of skin prick test were analyzed with allergic sino nasal polyp it revealed a sensitivity of 54.55% and a specificity of 79.17%.Total serum IgE analysis with allergic nasal polyp revealed a sensitivity of 63.64% and a specificity of 25.0%. Absolute Eosinophil Count with allergic nasal polyps in the present study revealed a sensitivity of 81.81% and a specificity of 20.83%.

When laterality of nasal polyps was analysed with allergic nasal polyp it showed a sensitivity of 32% and a specificity of 54%. Data analysis showed that there was no significant association of unilateral nasal polyps with allergic nasal polyp (p=0.5563). These results were documented in tables 4, 5, 6.

Epithelium	No. of cases N=46	%
Ciliated	27	58.70
Columnar	15	32.60
Squamous metaplasia	11	23.91
Goblet cell Hyperplasia	21	45.65
Hypertrophy of glands	20	43.48
Eosinophilia	46	100.0
Other cells increase	26	56.52

Table 1: Histopathology of nasal polyps Epithelium, Goblet Cell Hyperplasia, gland hypertrophy, cell types N=46

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Grading of eosinophils	No. of patients N=46	%
1+, 2+ non eosinophilic	5	10.87
3+, 4+ eosinophil rich	41	89.13
Total	**46**	**100.0**

Table 2: Grading of eosinophils by Histopathological examination N=46

Clinical diagnosis		
	No. of patients N=46	**%**
Allergic	24	52.17
Non allergic/Inflammatory	22	47.83
Total	**46**	**100.0**
Histopathological diagnosis		
	No. of patients N=46	**%**
Allergic	22	47.83
Inflammatory/polypoidal	24	52.17
Total	**46**	**100.0**
Change in diagnosis on histopathology	4	8.70

Table 3: Diagnosis in sino nasal polyp N=46

Skin Prick test			
	Allergic nasal polyp N_1=22 (%)	**Inflammatory nasal polyp N_2=24 (%)**	**N=46 (%)**
Test Positive	12(54.55)	5(20.83)	17(36.96)
Test Negative	10(45.45)	19(79.17)	29(63.04)
Totals	**22(100.0)**	**24(100.0)**	**46**

Table 4: Skin prick test with diagnosis of allergic nasal polyp N=46

Total Serum IgE			
	Allergic nasal polyp N_1=22(%)	Inflammatory nasal polyp N_2=24(%)	N=46(%)
Test Positive	14(63.64)	18(75.0)	32(69.57)
Test Negative	8(36.36)	6(25.0)	14(30.43)
Totals	**22(100.0)**	**24(100.0)**	**46(100.0)**

Table 5: Total serum IgE with diagnosis of allergic nasal polyp N=46

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Absolute Eosinophil Count			
	Allergic nasal polyp N_1 =22 (%)	**Inflammatory nasal polyp N2=24(%)**	**N=46 (%)**
Test positive (37)	18(81.81)	19(79.17)	37(80.43)
Test negative(9)	4(18.19)	5(20.83)	9(19.57)
Total	**22(100.0)**	**24(100.0)**	**46(100.0)**

Table 6: Absolute eosinophil count with diagnosis of allergic nasal polyp N=46

DISCUSSION: Analysis of the available data in the present study shows that all the patients were in the age groups of 9 to 64 years. Majority of the patients in the study belonged to age group of 21 to 30 years of age group with a percentage of 30.43%. These findings were similar to the study by Khadkekar [8] where 31.33% of patients were in 21 to 30 years age group. In the present study of 46 cases, males dominated with 31 cases (67.39%).

Male to female ratio was 2.07:1. Documented literature reveals Male to female ratio in nasal polyps range from 2:1 to 4:1. [6]The finding in this study was on par with the other studies with respect to male: female ratio and closely follows Majumdar [9] study.

Symptoms of nasal obstruction was observed in 43(93.47%) of patients in this study. Other symptoms included discharge from nose in 28(60.88%) of patients followed by sneezes in 27(58.69%) of patients. All these findings are in agreement with the findings of Drakelee. [10] Smell disturbances were seen in 23(50.0%) of patients and itching seen in 15(32.60%) of patients. These clinical symptoms suggest that probably association of allergy was most probable etiology in patients of sino nasal polyps.

It was observed from this study that there appears to be no significant difference clinical presentation in symptoms of ethmoidal and antrochoanal polyps. These findings were in agreement with the study by Kamath et al [11] who stated antrochoanal polyp does not significantly differ in their presentation from ethmoidal polyps.

In this study cheesy debris in 4 (8.70%) of patients which is on par with Ravi Kumar. [12] Other endoscopic findings we observed in our study were nasal mucosa, number of polyps. Pale mucosa is seen in 19(41.30%) of patients followed by congested mucosa in 9 (19.57%) of patients. Multiple polyps were seen in 28 (60.87%) patients. Most of the polyps we observed endoscopically were seen below middle turbinate in 19 (41.30%).

In the present study skin prick test was performed in all the patients. Positive reactions to the skin prick test was seen in 17(36.96%) of patients. These findings closely resemble the findings in the study by Eghtedari. [5] and against the findings of the study by Kirtsreesakul. [2] Results of the study showed that one third of the patients with nasal polyps had positive skin test along with typical allergic nasal polyp.

In this study considering allergy to be the main cause of sino nasal polyps based on Histopathological diagnosis a sensitivity of skin prick test with Histopathological diagnosis of allergy showed sensitivity of 54.55% and a specificity of 79.17%. In a study by Caplin et al [13] it was observed that only 0.5% of patients with sino nasal polyps had allergy. Similarly in another study by Settipane GA [14] a lower incidence of allergy was observed in patients with sino nasal polyposis.

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Available documented literature suggests that there was a higher incidence of positive skin reactions to skin prick test in patients of sino nasal polyps than in the general population. [15]

It is believed that Total serum IgE reflects the overall atopic status of an individual. These levels vary widely among atopic and normal people. [16]Tondon [17] in his study observed a significant relationship between Eosinophilic infiltration of nasal polyp as well as IgE production.

In the present study elevated total serum IgE was observed in 32(69.67%) of patients. These findings were similar to the findings in the study of Kamath et al.[11] When the elevated levels of total serum IgE was compared with Histopathological diagnosis, it was observed that in patients of sino nasal polyposis diagnosed as allergic clinically it had a sensitivity of 63.64% and a specificity of 25.0%.

It was observed that elevation of Absolute Eosinophil Count in allergic nasal polyps had a sensitivity of 81.82% and a specificity of 20.84%.There was a significant difference in elevated eosinophils in the study between Ravi Kumar [12] and the present study. This may be because, raised eosinophil count is observed in varied conditions of allergy apart from nasal allergy.

In the present study Histopathological examination revealed positive allergic mucin in 24 (52.17%) of patients which closely follows the study by Ravi Kumar [12] who stated that the allergic mucin was observed in 4 (40.0%) of patients. Allergy is suspected to be etiological factor in sino nasal polyps if along with eosinophils there is goblet cell hyperplasia in epithelium, hypertrophy of glands, and mucin in edematous tissue. [18]

In the present study sino nasal Polyps were grouped into Eosinophilic or allergic and inflammatory types depending on the predominance of eosinophils by histopathology. Eosinophils were graded by in this study by a semi quantitative grading where they were quantified as specimen rich in Eosinophilic infiltrate (25-50 cells/HPF, >50 cells/HPF) or specimen showing nonspecific inflammatory infiltrate (1-10 cells/HPF, 10-25 cells/HPF). Absolute Eosinophil Count was elevated in 37 (80.43%) of patients of sino nasal polyps.

There was only a mild raise in Absolute Eosinophil Count(less than 1000 cells/cu.mm) in 34 (73.91%) of patients, remaining 3 patients showed a moderate raise. In a study by Abheysood [19] 22(55.0%) of the patients were eosinophil rich. Increased tissue eosinophilia however does not occur only in allergy, but it also increases in other inflammatory conditions also. Thus increased eosinophilia alone will not point to allergy as the etiological factor in sino nasal polyps.

In this study mucin was seen in 23(50.0%) of patients and fungal hyphae is seen in only 1(2.17%) patient. Other histological findings are ciliated epithelium in 27(58.70%) of patients, columnar epithelium in 15(32.60%) of patients and squamous metaplasia in 11(23.91%) of patients. In the present study goblet cell hyperplasia was observed in 21(45.65%) of patients, hypertrophy of glands in 20(43.48%) of patients. Observations in the present study state that there was a change in diagnosis in 8.70% of patients.

In the present study it is observed that etiology of sino nasal polyps can be arrived with clinical investigations of total serum IgE, Absolute eosinophil count and skin prick test. The Clinical diagnosis has to be confirmed always with histopathology to confirm the exact nature of Sino nasal polyp where a variation in diagnosis can exist. Histopathological examination of the sino nasal polyp reveals the true nature of the disease.

CONCLUSION:

1. Etiology of sino nasal polyp is to be confirmed by clinical investigations of total serum IgE, Absolute eosinophil count and Skin prick test.
2. Total serum IgE, Absolute eosinophil count and Skin prick test help in the clinical diagnosis of sino nasal polyps.
3. Histopathological confirmation is a must to know the exact nature of sino nasal polyp.

ACKNOWLEDGEMENT: I express my sincere and heartfelt gratitude to Dr. Col. C. G. Wilson, Principal, Kamineni Institute of medical sciences, Dr. Amrithlal Professor & Head, Department of ENT, Dr. Sailaja, Department of Pathology, and the staff, management of Kamineni Institute of Medical sciences, Narketpally for their support during this study. I extend my sincere thanks to Dr. Ajay George, my mentor for his whole hearted guidance in analysis of this data. Also I would like to thank Dr Sunaina Waugh ray for her support in the study.

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Date of Submission: 20/08/2014.
Date of Peer Review: 21/08/2014.
Date of Acceptance: 25/08/2014.
Date of Publishing: 27/08/2014.