

INCIDENCE OF FUNGAL ELEMENTS IN SINONASAL POLYPOSIS

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ABSTRACT

BACKGROUND

Nasal polyposis is a disease entity characterised by formation of pseudoedema of sinonasal mucus membrane progressing to form polyps. It presents clinically with nasal obstruction and fleshy masses in the nasal cavity. The nasal mucosa reacts to formation of polypi in allergic fungal sinusitis also. The present study is an attempt to demonstrate possible fungal elements from the polypi removed during surgery by KOH study and HPE study.

The aim of the study is to find out the incidence of fungal elements in sinonasal polyposis.

MATERIALS AND METHODS

50 patients attending the ENT OPD for nasal obstruction and showing polypi on anterior rhinoscopy were selected. All the patients were subjected to surgery and specimens collected were subjected to KOH study and histopathology to demonstrate fungal elements.

RESULTS

Among 50 patients, the age range was from 9-57 years; mean age- 36.46 years. The male-to-female ratio was 1.5:1. Deviated nasal septum was found in 38% of patients. Among the unilateral cases, 47% were antrochoanal polyps and 53% were ethmoid polyps. Out of 50 patients, only 3 specimens were positive for fungal elements with KOH study and only 2 cases with fungal culture. Thus, the incidence of fungal elements in sinonasal polyposis was 6%.

CONCLUSION

The incidence of fungal elements in sinonasal polyposis was 6%. Histopathological examination of polypectomy specimen was negative for invasive fungal disease and showed inflammatory changes only. There is no difference in the detection of the presence of fungal by two methods.

KEYWORDS

Aspergillus, Fungal, Polypi, Polyposis, Allergic Fungal, Sinusitis, HPE.

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BACKGROUND

Nasal polyposis consisting of multiple/single, unilateral or bilateral polyps is part of an inflammatory reaction involving the mucous membrane of the nose, the paranasal sinuses and often the lower airways.^{1,2} In its broadest sense, nasal polyposis should probably be regarded as one form of chronic inflammation in the nose and sinuses, i.e. part of the spectrum of chronic rhinosinusitis.³ The aetiology in the large majority of cases is unknown as the pathogenesis of polyp formation is poorly understood. The patient will experience nasal polyps to be an unpleasant disease, which severely interferes with the quality of life.⁴ Thus, it remains as a significant challenge to the treating physician. The role

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of fungal agents in the pathogenesis of sinus disease remains unclear. Several fungal organisms maybe involved in these various pathologies such as Aspergillus, Scedosporium, Alternaria, Curvularia and Mucor. Fungi are found mainly in air, dust, soil, plants and decaying organic matter. They adhere to dust particles and are inhaled and deposited on the nasal and paranasal sinus mucosa. The warm, moist environment of the upper respiratory tract is an ideal environment for the proliferation of this organism.^{5,6} However, they are rarely pathogenic because host resistance is high except under favourable growth conditions in highly susceptible individuals. The treatment modalities of nasal polyps encompass both medical and surgical modalities following the assessment of the patient. Medical treatment consists of intranasal and systemic corticosteroids. Possibly, leukotriene antagonists may have an additional effect in selected patients. The present study is undertaken to evaluate the incidence of fungal elements in sinonasal polyposis.

MATERIALS AND METHODS

The study was conducted for a period of 12 months starting from January 2014. 50 patients with sinonasal polyps who



were treated surgically from the Department of ENT, Government Medical College, Thrissur, during this period were included in this study.

Study Design- Descriptive diagnostic study.

Inclusion Criteria

Patients with sinonasal polyps were included in the study.

Exclusion Criteria

Patients who were operated outside the hospital. Patients with histopathology reports of other than ethmoidal polyps. Patients treated with medical treatment only. Patient's with history of fungal rhinosinusitis. Patient's not willing to be included in the study.

Methods of Study

Ethical committee clearance was obtained initially. The patients who satisfied the inclusion criteria were included in the study. Initial patient workup included detailed history taking about the symptoms and their duration. Then, a detailed clinical examination including anterior rhinoscopy, posterior rhinoscopy throat and ear examination was done. All patients were given medical treatment in the form of local steroids and a course of broad-spectrum antibiotics. Nasal endoscopy was done to assess the disease state and nasal anatomy. Then, they were subjected to computerised tomography scan of paranasal sinuses- both axial and coronal views. Patients were then taken up for surgery under local anaesthesia after routine preoperative workup. The extent of surgery was decided by the findings in preoperative CT scan and intraoperative findings. After polypectomy by surgery, samples were divided into two parts under sterile process in operation room. One part of the specimen was put in sterile normal saline and the other in formalin. The specimens were subjected to direct microscopy of mucus and polyps with 10% KOH and the other part was sent for fungal culture in Sabouraud dextrose agar. The specimens were also studied for histopathology (HPE) by Haematoxylin and Eosin stain and pathology were performed.

Analysis Method

The data were entered in an excel spread sheet and statistical analysis was performed using Microsoft excel and Statistical Package for the Social Sciences (SPSS) version 16 for windows. For categorical variables, McNemar's Test was done to test whether there is any difference in the detection of the presence of fungal in two methods.

OBSERVATIONS AND RESULTS

In the present study, 50 patients with sinonasal polyps were included. The following observations were made and analysed. Age of the patients in the study ranged from 9-57 years with a mean age of 36.46 years (Table 1).

Age Groups	Frequency	Percentage
1-10	1	2.0
11-20	7	14.0
21-30	5	10.0
31-40	17	34.0

41-50	12	24.0
51-60	8	16.0
Total	50	100.0

Table 1. Showing the Age Distribution (n=50)

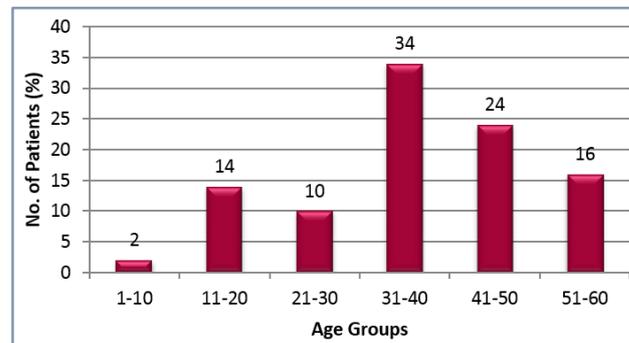


Figure 1. Age Wise Classification

The present study, the most common age group was 31-40 years (34%) followed by 41-50 years (24%) (Figure 1). Among the 50 patients, males were found to be more commonly affected than females with a ratio of 1.5:1.

Sex	Frequency	Percentage
Male	27	54.0
Female	23	46.0
Total	50	100.0

Table 2. Showing Gender Distribution (n=50)

All patients presented with nasal obstruction (100%). The nasal obstruction was unilateral in 38% of patients, (12% with left sided and 26% with right-sided nasal block) and 62% with bilateral nasal block). Next commonest symptom was recurrent nasal discharge (82%), followed by smell disturbances (48%), postnasal drip (38%), nasal mass and sleep disturbance (10%) and headache (6%), (Table 3).

Complaints	Frequency	Percentage
Left nasal block	6	12.0
Right nasal block	13	26.0
Bilateral nasal block	31	62.0
Nasal discharge	41	82.0
Nasal mass	5	10.0
Postnasal drip	19	38.0
Headache	3	6.0
Sleep disturbance	5	10.0
Smell disturbance	24	48.0

Table 3. Showing the Incidence of Presenting Complaints (n=50)

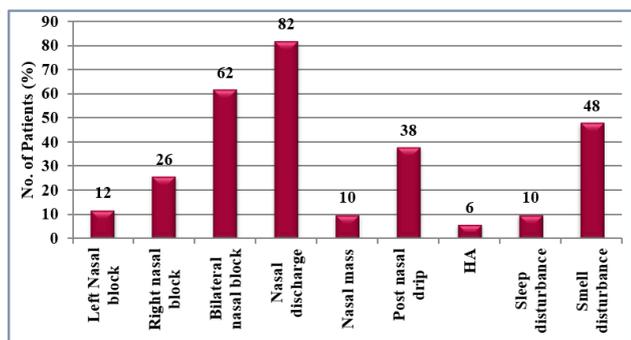


Figure 2. Showing Bar Chart of the Presenting Complaints (n=50)

In this study, 2% of patients had bronchial asthma, hypertension, diabetes mellitus and pulmonary tuberculosis, but none of them had history of drug intolerance. Among these 2% of patients, one patient had diabetes mellitus and positive for fungal elements in KOH study. All other specimens were negative for any evidence of fungal infection by KOH, fungal culture or histopathological examination of polypectomy specimens.

History	Frequency	Percentage
Bronchial asthma	1	2.0
Drug intolerance	0	0
DM	1	2.0
HTN	1	2.0
PTB	1	2.0

Table 4. Showing Incidence of Past History (n=50)

Anterior rhinoscopy examination showed deviated nasal septum in 38% of patients (19 out of 50). Out of 19 cases, 12 cases have deviation to left (24%) and 7 cases have deviation to right (14%), (Table 5) and (Figure 3).

DNS	Frequency	Percentage
Nil	31	62.0
Left	12	24.0
Right	7	14.0
Total	50	100.0

Table 5. Showing Evidence of DNS on Clinical Examination (n=50)



Figure 3. Showing CT Scan Picture With Gross Deviated Nasal Septum

On clinical examination, 34% (17/50) are unilateral nasal polyp and rest of them are bilateral polyp. Among the unilateral cases, 47% were antrochoanal polyps (8 cases) and 53% (9 cases) were ethmoid polyp on further evaluation by CT scan and during surgery. Two patients had inferior turbinate hypertrophy in left nose (Table 6) (Figure 4).

Area	Frequency	Percentage
single left	7	14.0
Single right	10	20.0
Single bilateral	4	8.0
Multiple left	1	2.0
Multiple right	1	2.0
Multiple bilateral	27	54.0
Total	50	100.0

Table 6. Showing Incidence of Nasal Polyps on Clinical Examination (n=50)



Figure 4. Showing Polyp on Clinical Examination

CT scan showed deviated nasal septum in 19 patients, which is similar to that of clinical examination (Table 7).

DNS	Frequency	Percentage
Nil	31	62.0
Left	12	24.0
Right	7	14.0
Total	50	100.0

Table 7. Showing Incidence of DNS on CT Scan (n=50)

CT scan showed features of sinusitis in all patients. Among them, maxillary sinus was most commonly affected along with the ethmoid sinus. Most of the CT scan showed pansinusitis and only 10 cases had single sinus involvement (Table 8).

Sinusitis	Frequency	Percentage
Frontal	29	58.0
Maxillary	47	94.0
Ethmoid	42	84.0
Sphenoid	11	22.0

Table 8. Showing the Incidence of Sinuses Involved on CT Scan (n=50)

In the present study, 3 patients were positive for fungal elements by KOH in which two are positive by fungal culture and one is negative by fungal culture (Table 9).

Groups		Fungal Culture		Total
		Positive	Negative	
KOH	Positive	2	1	3
	Negative	0	47	47
	Total	2	48	50

Table 9. Showing the Association of Results Obtain from Fungal Culture and KOH (n=50)

McNemar’s test was done to test whether there is any difference in the detection of the presence of fungal in two methods. P-value was found to be very near to one indicating acceptance of the null hypothesis that there is no difference in the detection of the presence of fungal by two methods.

By considering culture method as reference method-

Sensitivity = 100
 Specificity = 97.92
 Positive predictive value = 66.7
 Negative predictive value = 100
 False positive rate = 2.08
 False negative rate = 0

In the present study, out of 50 patients, only 3 specimens were positive for fungal elements with KOH study and only 2 cases with fungal culture. Thus, the incidence of fungal elements in sinonasal polyposis was 6%. Even though, 3 cases were positive for fungal elements in KOH study, only two of them were positive with fungal culture. In

	My Study	Drake Lee AB ⁹	S.P. Gulati et al ¹⁰	P. Kordbacheh et al ⁷
M:F ratio	1.5	2	2.7	1.86

Table 11. Showing the Gender Distribution in Comparison with Other Studies

All patients presented with complaints of nasal obstruction (100%), which was similar to other studies like that by Drake Lee AB⁹ and Ragini Tilak et al.⁸ Out of this, 38% of patients presented with unilateral nasal block (12% with left sided and 26% with right-sided nasal block) and 62% with bilateral nasal block. Next, commonest symptom was recurrent nasal discharge (82%) followed by smell disturbance (48%), postnasal drip (38%), nasal mass and sleep disturbance (10%) and headache (6%). In the present study, 2% of patients had bronchial asthma, hypertension, diabetes mellitus and pulmonary tuberculosis, but none of them had history of drug intolerance. Out of these, only one patient presented with diabetes mellitus has got fungal elements in KOH study, all others were negative for any fungal infection by KOH, fungal culture or histopathological examination of polypectomy specimen. In a study by P. Kordbacheh et al,⁷ the patients with sinonasal polyposis had history of chronic rhinosinusitis and asthma. But, in this study, significant correlation between polyp and asthma could be established even though chronic rhinosinusitis was

one case, causative organism was Aspergillus flavus and the other was Paecilomyces species. Histopathological examination of polypectomy specimen was negative for invasive fungal disease and showed inflammatory changes only.

DISCUSSION

The study was conducted for a period of 12 months starting from 1-1-2014. 50 patients with sinonasal polyps who were treated surgically from the Department of ENT, Government Medical College, Thrissur, during this period were included in this study. All surgical specimens were sent for KOH and fungal culture to look for presence of fungal elements, along with that histopathological examination of specimen done to rule out invasive fungal disease. In the present study, the most common age group was 31-40 years (34%) followed by 41-50 years (24%) with mean age of 36.46 years and this was similar to the study by P. Kordbacheh et al⁷ with a mean age of 41 years and Ragini Tilak et al⁸ with a mean age of 40 years (Table 10).

	My Study	Drake Lee AB ⁹	Ragini Tilak ⁸ et al
Mean age	36.46	41	40

Table 10. Showing Age Wise Distribution in Comparison with Other Studies

In the present study, males were found to be more commonly affected than females with a ratio of 1.5:1, which is similar to other studies by Drake Lee AB,⁹ S.P. Gulati¹⁰ et al, P Kordbacheh et al,⁷ etc. But, in a study by Ragini Tilak et al,⁸ there was female predominance (6/10 cases) that maybe due to small sample size.

present in majority of patients. Anterior rhinoscopy examination showed deviated nasal septum in 38% of patients (19 out of 50). On clinical examination, 34% (17/50) are unilateral nasal polyp and rest of them are bilateral polyp. Among the unilateral cases, 47% were antrochoanal polyp (8) and 53% (9) were ethmoid polyp on further evaluation by CT scan and during surgery. Two patients had inferior turbinate hypertrophy in left nose. Anterior rhinoscopy examinations were not mentioned in similar studies hence comparison not done. CT scan showed deviated nasal septum in 19 patients, which is similar to that of clinical examination. CT scan showed features of sinusitis in all patients. Among them, maxillary sinus was most commonly affected along with the ethmoid sinus. Most of the CT scan showed pansinusitis and only 10 cases had single sinus involvement. In this study, only 3 cases were positive for fungal elements by KOH in which two are positive by fungal culture and one is negative by fungal culture.

Groups		Fungal Culture		Total
		Positive	Negative	
KOH	Positive	2	1	3
	Negative	0	47	47
	Total	2	48	50

Table 12. Showing Association of Results from Fungal Culture and KOH Study

McNemar's test was done to test whether there is any difference in the detection of the presence of fungal in two methods. P value was found to be very near to one indicating that accept the null hypothesis that there is no difference in the detection of the presence of fungal by two methods. In this study, out of 50 cases, only 3 cases were positive for fungal elements with KOH study and only 2 cases with fungal culture. Thus, the incidence of fungal elements in sinonasal polyposis in my study is 6%. In a similar study by P. Kordbacheh et al⁷ with a sample size of 100, 9 cases were positive for fungal elements by KOH and fungal culture and the incidence of fungal elements was 9%. In my study, one case causative organism is *Aspergillus flavus* and other is *Paecilomyces* species and in histopathological examination all are negative for any fungal elements. In a similar study by P. Kordbacheh et al,⁷ most commonly isolated fungi was *Aspergillus flavus* (n=7) followed by *Aspergillus fumigates* (n=1) and *Rhizopus* sp. (n=1). Histopathological examination of these specimens also revealed soft tissue invasion by fungal elements in 6 cases.

CONCLUSION

The incidence of fungal elements in sinonasal polyposis was 6%. Even though, 3 cases were positive for fungal elements in KOH study. Only two of them were positive with fungal culture. In one case, causative organism was *Aspergillus flavus* and the other was *Paecilomyces* species. Histopathological examination of polypectomy specimen was negative for invasive fungal disease and showed inflammatory changes only. There is no difference in the detection of the presence of fungal by two methods.

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