



FUNGI AND ETHMOIDAL POLYPOSIS: A GROWING RELATIONSHIP

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ABSTRACT

Objectives: To find out the incidence of fungus in patients present with ethmoidal polyposis. **Materials And Methods Study Setting** - The present study was conducted in the department of ENT, in a tertiary care hospital, Bhubaneswar, Odisha. **Study Period:** 2 Years (September 2019 to August 2021). **Sample Size:** 76 **Study Design:** Prospective study **Inclusion Criteria** Clinically proven cases of ethmoidal polyp Patients who have given written consent for the study **Exclusion Criteria** Sino-nasal malignancy Immunocompromised patients **Methodology:** Data collected from all the patients presenting in ENT department with diagnosis of ethmoidal polyposis. All the relevant information about their presenting symptoms was recorded in a pro-forma. Data was analyzed through Chi-square test. **Results:** Out of 76 patients 44 were males and 32 were females. Underlying fungus was present in 9(11.8%) and out of them, 5(55.5%) were males and 4(44.5%) were females. Mean age was 43.83 +/- 14.82 years. Aspergillus was the commonest organism found. **Conclusion:** Underlying fungus was found in a significantly high number of patients presented with ethmoidal polyposis and Aspergillus flavus was the commonest organism found.

KEYWORDS : Ethmoidal Polyposis, Fungus, Aspergillus**INTRODUCTION**

Polyp is derived from Greek, meaning "many footed" (poly, many; pous, footed). The prevalence of nasal polyps has been shown to be as high as 32-40% in cadaveric studies.(1)

Nasal polyps are the local manifestation of chronic inflammatory illness of the sinonasal tract in its ultimate stage. Chronic rhinosinusitis with nasal polyps(CRSwNP) is a distinct subset of chronic rhinosinusitis(CRS).(2)

CRSwNP affects between 1 and 20 people per 1000 people each year.(3) Chronic rhinosinusitis (CRS) is a condition in which the nose and paranasal sinuses are inflamed for an extended period of time.

Over the last two decades, the pathophysiology of CRS has been extensively researched. However specific etiology is still unknown. Fungi are the causes of a variety of diseases, including rhinosinusitis.(4,5) Fungal sinusitis affects 5-10% of chronic rhinosinusitis patients.

Fungal Rhinosinusitis (FRS) is becoming more widely recognised in persons of various ages. FRS has an impact on the society's commercial and economical position. Patients suffering from acute invasive FRS have a high morbidity and fatality rate.(6)

Fungal stains such as Gomori's methenamine silver (GMS) or 10 percent potassium hydroxide (KOH) mount can be used to show the presence of fungal hyphae in sinus secretions. Culture on Sabouraud dextrose agar (SDA) with antibiotics is used to confirm the diagnosis.

There is demographic heterogeneity in the fungi that cause rhinosinusitis; in the west, dematiaceous fungi are the most prevalent cause of rhinosinusitis, whereas in India, Aspergillus is the most common cause of rhinosinusitis. Aspergillus species such as Aspergillus flavus (A. flavus) or Aspergillus niger (A. niger), as well as dematiaceous fungus such as Bipolaris spicifera and Curvularia lunata, are the most typically isolated organisms.(7)

Numerous research have attempted to uncover the exact aetiology of this disease over the last few decades, and while many have identified elements that are assumed to be connected and associated, none have come to a clear conclusion concerning cause.

The present study is aimed at determining the prevalence of fungus among patients presenting with ethmoidal polyposis. The samples of the polypoidal tissue and nasal secretions were collected and are tested for the presence of fungi by subjecting the samples for KOH mount and Fungal Culture.

MATERIALS AND METHODS**Study Setting -**

The present study was conducted in the department of ENT, in a tertiary care hospital, Bhubaneswar, Odisha.

Study Period:

2 Years (September 2019 to August 2021).

Sample Size: 76**Study Design:** Prospective study

Inclusion Criteria

Clinically proven cases of ethmoidal polyp Patients who have given written consent for the study

Exclusion Criteria

Sino-nasal malignancy Immunocompromised patients

Methodology -

Proper history was taken and clinical examination was done for the patients with ethmoidal polyp. All patients underwent diagnostic nasal endoscopy to confirm the diagnosis and to obtain the specimens (polypoidal tissue and nasal secretions) for microbiological examination.

The polypoidal tissues were collected in a sterile container and Nasal secretions were collected in swab stick. The samples were subjected to direct microscopy with 10% potassium hydroxide and fungal culture.

Evaluation:

All patients were worked up based on a proforma. The diagnosis was confirmed by fungal culture and KOH examination of the specimen. The data collected from the patients was analyzed by Pearson's Chi-Square test.

RESULTS

In our study out of total 76 patients, 44(58%) were male and 32(42%) were female. Table -1 shows that, in our study most of the patients of CRSwNP were in age group of 31-40 years (i.e. 27.6%) followed by 41-50 years(21.1%). Mean age was 43.83 +/- 14.82 years.

Table 1 (Age distribution of patients with CRSwNP)

Age Group	Frequency	Percent
0-10	1	1.3
21-30	14	18.4
31-40	21	27.6
41-50	16	21.1
51-60	11	14.5
61-70	9	11.8
71-80	4	5.3
Total	76	100.0

Table - 2 shows, out of 76 cases of ethmoidal polyposis, 11.8% of cases turned out to have a fungal aetiology.

	Frequency	Percent
Fungus rhinosinusitis with ethmoidal polyp	9	11.8
Non-Fungus rhinosinusitis with ethmoidal polyp	67	88.2
Total	76	100.0

Table 2 (Overall cases of Fungal rhinosinusitis in Patients with CRSwNP)

	Frequency	Percent
Fungus rhinosinusitis with ethmoidal polyp	9	11.8
Non-Fungus rhinosinusitis with ethmoidal polyp	67	88.2
Total	76	100.0

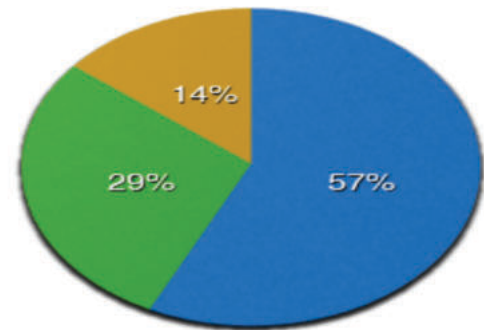
Out of 76 CRSwNP patients, samples of 7 patients i.e 9% were found positive on fungal culture, while 69 i.e.91% samples shows no evidence of growth on fungal culture. 9 samples i.e. 12% show fungal elements , while 67 (88%) were negative for KOH Mount.

Overall 9 (11.8%) patients were having fungal etiology. Most of the isolates were Aspergillus flavus 57% (4 cases), followed by Aspergillus fumigatus 29% (2 cases), while only 1 case of candida detected (Table- 3, Graph -1). For 2 cases fungus species could not be identified (culture negative).

Table 3 (Fungal Species isolated in Patients with CRSwNP) (n=7)

Fungus species	Frequency	Percent
Aspergillus flavus	4	57
Aspergillus fumigatus	2	29
candida	1	14

■ A flavus ■ A fumigatus ■ Candida



Graph 1(Fungal Species isolated in Patients with CRSwNP) (A. flavus - 4, A. fumigatus - 2, Candida - 1)

DISCUSSION

Nasal polyposis has long been thought of and treated as a basic and straightforward illness, but in recent years, worldwide literature has emphasized that this disease demands a lot of attention.

In the present study 76 patients of chronic rhinosinusitis with ethmoidal polyp(CRSwNP) were included. Age of the patients varied from 8 to 80 years . Majority of the patients were in the age group of 31 – 40 years, followed by 41-50 years and only one patient was less than 10 years(i.e. 8 years). The mean age of the patients affected with (CRSwNP) was (43.83 yrs) Std. Deviation of 14.8. Males were predominant (58%) compared to females (42%). Male to female ratio was (1.3:1).

Montone et al.(2012) in USA found that the mean age of CRS patients was on the higher side of 45 years with a range of 18–88 years, and male to female ratio was 1.2 :1,which is similar to this study (8). Klossek et al (9) research, the majority of patients were between the ages of 30 and 59. This is also similar to our study. However in contrast to our study Female predominance was seen in this study.

Male preponderance in our study is consistent with Prateek et al.(2013)(10) (1.33:1) and Shone GR (1.8:1) studies (11). Female preponderance was shown in studies by Micheal et al.(2016)(12) and Dufour et al.(13). The findings of this study can be explained by the fact that males are more frequently exposed to pollutants from traffic, dust, and industry.

In this present study, out of 76 cases of CRSwNP, the prevalence of fungal rhinosinusitis was found to be 11.8 %. In this study, fungal positivity was found in 9 patients by direct examination (KOH mount) or culture. Out of these, 7 were positive by culture and 9 were positive by KOH mounting. Two were KOH positive, while the culture was negative.This could be due to an inadequate specimen or contamination of the sample before subjecting it to culture.

Kavitha et al(2016), found prevalence of fungal rhinosinusitis of 11.3%, which is very much similar to our study.(14)

Satish et al.(2013) found the the prevalence of fungal rhinosinusitis is 7.3%, which is less than our study.(15) Ahmed et al(2019) Suez Canal University,Egypt found (25%) had fungus infection as histopathological examination for nasal

polyposis specimen.(16) A study conducted at zagazig university by Bahrawy et al.(2020) found 13.9% of the studied patients show positive fungal stain. This is also similar to our study.(17)

Fungi appear to have a major role in the worsening and persistence of mucosal inflammation in CRS, and the categorization of FRS has just recently been more completely characterised.

In this study majority of the fungi isolated were *Aspergillus* species(86%) in particular *A.flavus*. Out of the 6 *Aspergillus* isolates, 4 were *Aspergillus flavus* and 2 were *Aspergillus fumigatus*.This is due to the fact that their fungal spores are found in abundance in the soil and environment of tropical countries like India.

Michael et al. At CMC vellore done a retrospective study from January 2000-August 2007, and found that *Aspergillus flavus* is the most common fungus isolated from cases of fungal rhinosinusitis.(18)

Dematiaceous fungus, such as *Bipolaris* spp. and *Curvularia* spp., have been reported to predominate in allergic sinusitis in North America. (19)

The reasons for this disparity are unknown, however a number of factors could be at play. Because a large section of the population in India lives in rural or semi-rural locations, their exposure to fungus will differ from that of a more urban population in industrialized countries.

Despite the fact that fungal rhinosinusitis has long been recognized as a dangerous disease, our understanding of its epidemiology and medical microbiology is subjected to newer findings and study.

CONCLUSION

The frequency of fungal involvement in the nose and PNS with nasal polyps is substantially higher than previously thought.

Fungal sinusitis should be suspected in those patients with CRS presenting with signs and symptoms such as nasal obstruction, nasal polyps, rhinorrhoea, and headache. With the help of microbiological examination of sinus specimens, CT scans, and Diagnostic Nasal Endoscopy, the diagnosis of CRSwNP has become easier nowadays.

Due to the increased incidence of fungal infections of paranasal sinuses, otorhinolaryngologists should keep fungal infections in mind during their daily practice.

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