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INCIDENCE OF FUNGUS IN PATIENTS WITH CHRONIC RHINOSINUSITIS AND HEALTHY INDIVIDUALS

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ABSTRACT

Introduction: The presentation of patients with chronic fungal rhinosinusitis can be varied posing a diagnostic challenge to the treating physician. In reviewing the available literature, we realized that all the landmark studies on fungal rhinosinusitis were not done in our state.
Aim: Our study is aimed to know the incidence of fungus in patients with chronic rhinosinusitis and healthy individuals, Role of fungus as a contributing factor for failure of medical management in chronic rhinosinusitis patients.
Methods: This is a prospective observational study conducted in 40 patients with chronic rhinosinusitis who attended ENT OPD. All the patients were assessed clinically, endoscopically, radiologically, microbiologically and were given standard medical treatment. Based on response , patients were divided into two groups as Responders and Non responders. Incidence of fungus in both the groups as well as in healthy individuals were analysed.
Results : Of all the patients, 60% responded to medical management and 40% of patients had poor response. In our study Prevalence of fungus in responders was 65% , 86% in nonresponders and 45 % in healthy individuals.
Conclusion : Incidence and type of fungus was clinically and statistically significant in patients with poor response to medical management indicating fungus as important contributing factors for poor response to medical management.
Keywords: Chronic rhinosinusitis, Nonresponders, Healthy individuals(HI).

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INTRODUCTION

Chronic rhinosinusitis is one of the common diseases encountered in ENT practice causing significant morbidity to the patients. It affects approximately 20% of the population and has significant impact on quality of life of these individuals. Rhinosinusitis is defined as an inflammation of the mucous membrane that lines nose and paranasal sinuses and is defined as chronic rhinosinusitis, when the signs and symptoms last for more than 12 weeks. Fifty percent of patients with chronic rhinosinusitis respond to standard medical treatment [1].Patients who do not respond undergo surgical management.[1,2]

The presence of fungal organisms was once thought to be uncommon in cases of rhinosinusitis. But fungi being ubiquitous in nature and human exposure being inevitable , normal respiration will routinely deposit fungal elements in the nose . Fungus in the nasal cavity may lead to invasive forms including variants of acute, chronic, granulomatous or non invasive forms like allergic fungal rhinosinusitis. Acute invasive forms tend to occur in immunocompromised patients and chronic, granulomatous forms in immunocompetent patients. Studies examined chronic rhinosinusitis and were able to culture fungal organisms by special handling and novel methods in 96% of patients and in 100% of normal healthy individuals. Studies identified fungal elements in 92.5% of chronic rhinosinusitis patients by polymerase chain reaction technique and in 97.5% of normal healthy individuals.[3,4]

Literature search did not have reveal any reports about the fungal etiology as a probable cause for not responding to medical treatment in patients with chronic rhinosinusitis. In view of above, this study is designed to find out the incidence and any difference in type of fungal organisms present in nasal cavity in patients with chronic rhinosinusitis with good response and poor response to medication and also in healthy individuals.

PATIENTS AND METHODS

This is a Prospective observational study with sample size of 40 conducted in Department of Otorhinolaryngology and Head and Neck Surgery, Kamineni Academy of Medical Sciences and Research Center, from October 2023 – September 2024

Inclusion criteria: Patients above the age of 15 years and below the age of 65years , with regular follow up and not on any steroids for last one month.

Exclusion criteria: Patients with complicated chronic rhinosinusitis , who have undergone paranasal sinus surgery previously, history of hypersensitivity to pencillin, presence of nasal polyposis and infection from surrounding areas.

All the patients were included into the study after taking proper informed consent and Institutional Ethics Committee Clearance . After taking detailed history from the patient and complete clinical examination, all patients underwent Diagnostic nasal endoscopy and Non contrast computered tomography of nose and paranasal sinuses . During Diagnostic nasal endoscopy swab and nasal washings were collected for microbiological assessment for presence and type of fungus.

Standard medical treatment with Antibiotic (Amoxicillin+Clavulanic acid), antihistaminics , Saline nasal spray and Duonase nasal spray were given to all the patients for 2weeks . Depending upon the response to treatment, patients were divided into two groups. Group A(12) included patients with good response to medical management and Group B(8) included patients with poor response to medical management. The data between two groups were compared using Mann Whitney test and significance was ascertained using p value.

RESULTS

The findings are based on the study of 40 patients of which 20 patients were diagnosed with chronic rhinosinusitis and 20 patients were healthy individuals. Age distribution revealed

that 83% in Group A and 62% in Group B were between 16 to 45 years. Most of the patients were males in both the groups accounting for 66.6% in Group A and 62.5% in group B .

On analysing the patients with chronic rhinosinusitis clinically , 73.3%(14) of patients presented with nasal obstruction , 65.3%(13) with nasal discharge ,57.3%(11) with headache ,44%(8) with facial pain and 18.6%(6) with hyposmia.
On examination ,about 68%(13) of patients had mucosal congestion and nasal discharge and 64% of patients had sinus tenderness

Mycological analysis in our study showed incidence of fungus is more in non responders(group B) 86.7% followed by patients with good response to medication(group A) 65% and least incidence was seen in healthy individuals(HI) 45% (statistically not significant p value >0.05)

Table-1:Comparision of presence of fungus in nasal lavage

Fungus	**Group A(12)**	**Group B(8)**	**HI(20)**
Present	7(65%)	6(86%)	9(45%)
Absent	5	2	11

In our study Aspergillus flavus showed overall highest incidence of 47.8% , were as in non responders Aspergillus niger has highest incidence (statistically significant with p value < 0.05)
Table-2: Comparision of patients according to type of fungus present.

Fungus	**Group A (7)**	**Group B (6)**	**HI(9)**	**No of patients 22 (%)**
A.Flavus	4	1	6	11(50%)
A.Fumigatus	2	2	3	7(31.8%)
A.Niger	1	3	0	4(18%)

DISCUSSION

Chronic rhinosinusitis being one of the common diseases encountered in ENT practice, it is important to know incidence and type of fungus responsible for poor response to medical treatment to plan appropriate management. In this study 40 immunocompetent patients were included. The minimum age of the patient in our study was 16 years and maximum age was 65 years with 72% of patients between the age of 16 to 45 years. In a study conducted by Thaimoor latif et al[5] and Raziuddin Ahmed et al[6] maximum age group was between 31 to 40 years and 21 to 40 years respectively. In a study conducted by Sheetal et al[7] and Kirtane MV et al[8] maximum age group was between 20 - 40 and 20 –30 years respectively. Our study correlated well with all the above studies.

In our study, 25(62.5%) were males and 15(37.5%) were females showing male predominance. In a study conducted by Sheetal etal, 62% were male and 38% were females.In a study conducted by Zojaji et al[9] , 69% were male and 31% were females. Above studies showed significant male predominance similar to our study.

Fungus was present in 65%(7) of patients with chronic rhinosinusitis, 45%(9) of healthy indiviuals and 86%(6) of non responders in nasal lavage . The prevalence rate of fungal isolation by the study conducted in chronic rhinosinusitis patients by Amin and Kakru[10] at

Srinagar was found to be 30%, and by Chakraborty et al[10] 42% at Chandigarh, Venugopal et al[11] in Tamil Nadu 45%, In a Malaysian study, the prevalence was found to be 26.7%, Braun et al[12] in Europe, found that 75.5% of specimens were positive fungal elements.
According to Cody et al[13] , 10 to 20% of patients with chronic sinusitis who undergo surgery have fungus as the main etiologic agent . Chhabra et al[14], after analyzing 28 consecutive cases of nasal polyposis, isolated fungi from the paranasal sinuses in 11(39%) patients.
In a study by Ponikau et al[3] and kim et al[4] incidence of fungus in healthy individuals was 100% and 97.5%. In study by Ponikau et al[3] and kim et al[4] incidence of fungus was very high in healthy individuals when compared to our study .Higher incidence of fungus in other studies may be because of special handling techniques and polymerase chain reaction for fungal culture .

Table-3:comparision of presence of fungus in chronic rhinosinusitis patients

Authors	**Year of study**	**Presence of fungus in CRS patients**
Amin and Kakru[10]	2012	30%
Chakraborty et al[15]	2012	42%
Venugopal et al[16]	2014	45%
Braun et al[12]	2012	75.5%
Present study(n=40)	2024	65%

Table-4: Comparision of presence of fungus in healthy individuals

Author	**Year of Study**	**Incidence of Fungus**
Ponikua et al[2] (N= 210)	1999	100%
Kim et al[1] (N=122)	2005	97.5%
Present Study(N= 40)	2024	45%

Out of 22 of total patients with presence of fungus , 50% (11) have Aspergillus flavus , 31.8%(7) have Aspergillus fumigatus,18%(4) have Aspergillus niger. Highest incidence of Aspergillus flavus when compared to other fungus. In the study conducted by Raziuddin ahmed et al[6], 17 patients were positive among the 26 study population for fungal element and Aspergillus flavus was most common species (6 patients) identified. In a study conducted by Razmpa E et al[17], 17 among 50 patients in the study were found to be positive for fungal organism. Predominantly Aspergillus flavus was found in 17 patients. O Satyanarayana et al[18] in his study population of 50 had 30 cases positive. Among these 30 patients 13 had Aspergillus flavus isolated. In our study, Aspergillus flavus is most commonly isolated fungus, correlated with studies of Raziuddin ahmed et al[6], Razmpa E et al[17] and O Satyanarayana et al[18].

Table-5: Comparision of type of fungus with highest incidence

Authors	**Type of study**	**Type of fungus**

Raziuddin Ahmed et al[6] (n= 26)	2012	Aspergillus flavus (35%)
Razmpa E et al[17] (n = 50)	2007	Aspergillus flavus (100%)
O Satyanarayana et al[18] (n = 50)	2015	Aspergillus flavus (43.3%)
Present study(n=40)	2024	Aspergillus flavus (50%)

Our study had shown that Aspergillus niger was predominantly present in non responders where as Aspergillus flavus was present in health indiviuals and responders . From the above it is can be inferred that it is not mere presence of fungus causes failure of medical management but probably the type of fungus as a role to play

Identifying this type of fungus in patient may give us a reasonable indication that they may not respond to medical management.

CONCLUSION

Our study showed predominance of Aspergillus flavus in responders and healthy indiviuals and Aspergillus niger and Aspergillus fumigates in non responders. We can conclude that presence of Aspergillus fumigates and Aspergillus niger should always be considered as an important factor in patients with poor response to medical management. Further studies are required to see whether adding antifungal treatment along with standard medical treatment in patients detected to have Asperillus niger and Aspergillus fumigatus in nasal lavage will translate to increase in number of responders or not .

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