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Allergic Fungal Rhinosinusitis in Chronic Rhinosinusitis

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ABSTRACT

Background: Rhinosinusitis is the inflammation of nasal and paranasal sinus mucosa and is associated with mucosal alteration ranging from inflammatory thickening or gross nasal polyp formation.The main objective of this study is to determine the prevalence of allergic fungal rhino sinusitis among the patients having chronic rhino sinusitis with or without polyps who under goes functional endoscopic sinus surgery.

Methods: The patient with chronic rhinosinusitis with or without polyp who FESS were studied. Surgical specimens were sent for mycology and histopathological analysis for identification of fungus.

Results: Headache 41(82%) and nasal block 45(90%) were the commonest clinical presentation. Out of 50 patients, fungal elements were detected by KOH in 8(16%) of cases and histopathological examination in 11(22%) of cases.

Conclusions: Allergic Fungal Rhinosinusitisis a common disorder in patients with chronic rhinosinusitis, it need different specific tests for the diagnosis, a more specific diagnostic tests are fungus culture, and IgE to fungal antigen and skin test are needed for definite diagnosis.

Keywords: allergy, fungus, rhinosinusitis, sinusitis

INTRODUCTION

Rhinosinusitisis the inflammation of nasal and paranasal sinus mucosa and is associated with mucosal alteration ranging from inflammatory thickening or gross nasal polyp formation.[1] This inflammation of the nasal and sinus mucosa may be due to microorganisms such as bacteria and fungi, allergic and non-allergic immunological inflammation, and noninfectious, non-immunological causes.[2] Recent studies have shown the role of airborne fungi in the pathogenesis of chronic rhinosinusitis (CRS) is very common.[3]

Allergic fungal rhinosinusitis(AFRS) is an allergy to fungus in an immunocompetent patient.[3] It is a noninvasive type of fungal rhinosinusitis. AFRS has been reported worldwide with an incidence of 5% to 10% of all cases of chronic rhinosinusitis requiring surgery.[4,5] The diagnosis of AFRS is not clearly defined, the hall mark of allergic fungal rhinosinusitis is the allergic mucin on pathological examination and mycelia filament on direct mycological examination.

The objective of this study is to determine the prevalence of allergic fungal rhino sinusitis among the patients having chronic rhino sinusitis with or without polyps who underwent Functional Endoscopic sinus surgery at Department of ENT.

METHODS

A prospective, cross sectional study was conducted in the department of ENT, Head and Neck Surgery, Kathmandu Medical College Teaching Hospital, Kathmandu from January 2010 to February 2011. Consent was taken from the patients for the study. The patients were diagnosed

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clinically with chronic rhinosinusitis with or without polyps. All patients underwent Functional endoscopic sinus surgery.

The immunocompromised patients like diabetes mellitus, who were taking long term oral steroids and revision cases, were excluded from the study. Patients with chronic rhinosinusitis not responding to several medical treatments, CRS with polyps and all the age group and both sexes were included in the study. Preoperative examination of the patient includes (clinical information like) age, sex, history of nasal symptoms and history of asthma, and radiological examination like CT scan of nose and paranasal sinus. All patients received oral antibiotics seven days prior to surgery and oral steroids five days before surgery.

All the patients underwent Functional endoscopic sinus surgery under general anesthesia. Surgically evacuated materials included mucus together with inflamed tissue and polyps were kept in sterile tube containing 10% KOH solution and sent in Biochemistry department for direct microscopic examination. The remaining parts of surgical specimens were kept in another bottle containing formalin and sent in pathology department for histopathological examination and were stained with hematoxylin and eosin.

The specimen mixed with KOH was examined under direct microscope for the presence of fungal element. The size, morphology and quantity of any fungal element were noted. Tissues sent for histopathological examination were stained with hematoxylin and eosin (H&E) stain for identification of the allergic mucin with hyphae. If each sample is positive for fungal element in direct microscopic examination with KOH and histopathological examination, we considered it as a positive mycological criterion.

The statistical analysis was done using statistical package for social sciences (SPSS) version 13 for windows.

RESULTS

A total of 50 patients, clinically diagnosed with chronic rhinosinusitis not responding to medical therapy were undergone for FESS operation during the study period. Surgical specimens were sent for KOH mount for direct microscopic examination for fungal element and histopathological examination to see mucin with fungal hyphae.

The age of the study group of patients ranged from 11 years to 62 years. Of the 50 patients, 16(32%) were female and 34(68%) were male. The highest prevalence of CRS was seen in patients with 30 – 39 years old (Table 1).

Table 1. Age and sex distribution of patients with chronic rhinosinusitis.

Age	Female	Male	Total
10- 19	1	8	9
20-29	1	5	6
30-39	7	10	17
40-49	6	7	13
≥50	1	4	5
Total	16	34	50

Headache 41(82%) and nasal block 45(90%) were the commonest clinical presentation. Unilateral polyp and bilateral polyps were found in 18(36%) and 16(32%) of the patients respectively. Asthma was found in 17(32%) patients. Patients who had history of cough and also gave a history of asthma (Table 2).

Table 2. Clinical findings and history of patients with CRS.

Clinical finding	Number of patients (%)
Headache and facial pain	41 (82%)
Nasal blockage	45 (90%)
Nasal congestion	25 (50%)
Nasal discharge	28 (56%)
Post-nasal discharge	12 (24%)
Cough	16 (32%)
Polyps unilateral	18 (36%)
Polyp bilateral	16 (32%)
Asthma	17 (34%)

Table 3. Direct microscopic examination and histopathological examination for fungi.

Patient	Age	Clinical features		Histophathological examination	KOH
		Asthma	Polyp		
1	32	+	+	+	+
2	36	+	+	+	+
3	11	+	+	+	-
4	26	+	+	+	-
5	42	-	-	+	+
6	38	-	-	+	+
7	40	-	-	+	+
8	48	+	+	+	-
9	38	+	+	+	+
10	55	-	-	+	+
11	54	-	-	+	+

The H&E stain, allergic mucin with fungal hyphae without tissue invasion were seen in 11 patients. Based on the KOH preparation, fungal elements were seen in 8(16%) patients (Table 3).

Table 4. Correlation of KOH preparation and histopathological examination.

Method	Number (%)
KOH preparation positive	-
Both KOH and histopathological positive	8 (72.7)
KOH negative but histopathological positive	3 (27.3)
Total	11

If sample is positive for fungal element in histopathology and direct microscopic examination, it was considered as positive mycological criteria. Out of a total of 50 surgical cases, fungal elements were found in 11(5.5%) histological specimens (Table 4).

DISCUSSION

Approximately 300 species of fungi were documented as having caused diseases in human beings.[6] Most fungi are exogenous: they exist in the soil, water and organic debris. Aspergillus is one of the most important exogenous fungi, which can cause vast diversity of diseases in human. Fungal sinusitis currently has widespread clinical and pathologic interest.[7-11] Aspergillus has been reported as a major agent of FRS from different countries.[6]

This study assessed the prevalence of Allergic fungal rhinosinusitis in patients with CRS underwent surgery. Nasal block, headache, nasal congestion, nasal discharge and posterior secretion were the major clinical presentation in our patients. Same finding were observed by Hedayatiet al.[6] In the present study, fungal elements were detected by histopathological examination in 11 (22%), and KOH in 8(16%) cases. However, patients were positive histopathological examination didn't show fungal element in KOH preparation. As the sensitivity of this method is relatively low, this may be the cause for the negative KOH technique but positive histopathological examination. It was used in this study as KOH is cheap and easily available and Identification of fungal element is better achieved by KOH solution. This strong base can digest the human tissue, making fungal elements more visible and in this study, fungal elements were detected by KOH in 34% of cases.[6]

In our series, 6 out of 11 patients who had positive fungal element in H&E stain were suffered from nasal polyp and chronic rhinosinusitis according to AFRS criteria. Khademi etal had reported 9 out of 38 patients had met the criteria of AFRS.[12]

A study by Goh et al reported a prevalence of AFRS was 26.7% in cases of CRS patients treated surgically on the basis of Bent and Kuhn criteria.[13] In,Kawabori et al study from Japan, none of 40 consecutive patients undergoing endoscopic sinus surgery showed AFRS.[14] Another study has reported a prevalence of AFR was 12.1% of patients with CRS.[15] Similar results showed AFRS was seen in 12 patients among 50 patients.[6] It is concluded that prevalence of AFRS from different countries presented a vast diverse range in patients with CRS.[4] In our series fungal element was seen in 11 (22%) patients on histopathological examination. Sari-Aslani and B. Khademi et al. found fungal element in 9(4.2%) patients in histopathological examination and fungal culture.[13] Most of the fungal culture they found Candida albicans.[6] Goh et al. had reported that most fungi culture from allergic fungal sinusitis patients was aspergillus species. Fungal culture was not done in our study. This was not possible in our set up because of lack of Mycology department.

CONCLUSIONS

AFRS is a common disorder in patients with chronic rhinosinusitis. This study showed that the prevalence of AFR is 22%. It is concluded that there are different criteria for diagnosis of AFRS, a more specific diagnostic criteria are fungus culture, IgE to fungal antigen and skin test are needed to confirm allergic fungal sinusitis.

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