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Allergic fungal rhinosinusitis: a clinical study in Srikakulam

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ABSTRACT

Background: Allergic fungal rhinosinusitis is one of the differential diagnoses for chronic bacterial rhinosinusitis. Recognition and understanding of this unique disease will lead to efficient diagnosis and treatment of this curable process. India being a tropical country, provides an apt environment for fungal growth, the clinical diagnosis of Allergic fungal rhinosinusitis should not be missed and should be thoroughly investigated and managed to prevent recurrence. The objective of the study was to verify the management protocol for allergic fungal rhinosinusitis, after surgical clearance with functional endoscopic sinus surgery and postoperative histopathological examination and to see the efficacy of steroid and antifungal treatment
Methods: A one year prospective study was considered with 28 patients from July 2016 to July 2017. Clinically suspected cases of rhinosinusitis depending upon their clinical presentation were subjected to nasal endoscopy, radiological examination and functional endoscopic sinus surgery. Postoperative histopathological examination was performed. Patients were followed up after giving steroid and antifungal treatment.
Results: 28 cases were non-invasive. *Aspergillus* was found to be the most common isolate. The criteria responsible for good prognosis of allergic fungal rhinosinusitis management were mainly found to be functional endoscopic sinus surgery followed by topical corticosteroid therapy.
Conclusions: Allergic fungal rhinosinusitis is a disease entity on the rise. Prompt diagnosis and intervention prevents recurrence and complications.

Keywords: Rhinosinusitis, Nasal polyps, Hypersensitivity, Aspergillosis, Steroids, Itraconazole

INTRODUCTION

Allergic fungal rhinosinusitis is one of the most common differential diagnoses for chronic bacterial rhinosinusitis. It is known to occur throughout the world. It is even more commonly found to occur in tropical countries like India, and even more common in coastal areas [Srikakulam], due to the increased humidity levels.

Fungal rhinosinusitis was described for the first time in 1791 by Plaignaud in a 22-year-old male suffering from maxillary pain.[1] Thereafter, Schubert in 1885 and Mackenzie in 1894 described cases of a non-invasive form of paranasal rhinosinusitis.[2] In 1897, Oppe mentioned the possibility of an invasive variety of *Aspergillus* rhinosinusitis.[3]

The first published attempt to classify FRS came in 1965, when Hora recognized twocategories: one was noninvasive, behaving clinically like chronic bacterial sinusitis, and theother invasive, in which the infection results in a mass that behaves like malignant neoplasm, eroding bone and spreading into adjacent tissue[4].

It was first described by Saferstein as a distinct clinical entity in 1976, henoted a combination of nasal polyposis, crust formation, and sinus cultures yielding *Aspergillus* species.[5]

Miller etal in 1981, and in 1983, Katzenstein et al, separately documented a patho physiologic similarity among a few cases of chronic rhinosinusitis associated with a mucosal plug in the sinuses of patients with allergic Broncho pulmonary aspergillosis, which led to a description of a fourth type of fungal rhinosinusitis, namely allergic *Aspergillus* sinusitis.[6,7] Afterward, it became evident that melanized fungi are frequent etiological agents of this allergic type of sinusitis, which led to the renaming of this type of fungal rhinosinusitis as allergic fungal rhinosinusitis.[8,9]

Bent and Kuhn published their diagnosticcriteria centered on the histologic, radiographic, andimmunologic characteristics of the disease.[9]

McGill et al reported another type of FRS in immunocompromised patients: a fulminant form with rapid and malignant course.[10]

Theexplanation of allergic fungal rhinosinusitis has faced challenge with the demonstration of fungi in eosinophilic mucin without type Ihypersensitivity in most cases of chronic rhinosinusitis.[11,12] Ponikau et al kept a new name for thiscondition, namely eosinophilic fungal rhinosinusitis, to reveal the role ofeosinophils.[11]

Allergic fungal rhinosinusitis is currently defined as a non-invasive fungal sinusitis resulting from an allergic and immunologic response to the presence of extra mucosal fungal hyphae in the sinuses.[13]

Objectives

- To verify the management protocol for AFRS, after surgical clearance with Functional endoscopic sinus surgery (FESS) and postoperative histopathological examination (HPE).
- To see the efficacy of steroid and antifungal treatment.

METHODS

A one year prospective study was considered with 28 patients from July 2016 to July 2017 in RIMS medical college and government hospital. Patients were considered based on their clinical history and examination along with their diagnostic test reports.The gold standard for diagnostic categorization (Bent and Kuhn‘s criteria) was taken into consideration.[9]

Inclusion criteria

All patients with symptoms of allergic fungal sinusitis, with positive diagnostic nasal endoscopy (Kupferberg system), and Computed tomography findings of AFRS were included.

Exclusion criteria

All patients with sinusitis associated with invasive sinusitis, malignancy, and without DNE and CT findings were excluded.

Table 1: Bent and Kuhn diagnostic criteria for AFRS.

Major criteria	Minor criteria
Evidence of type I hypersensitivity	Asthma
Nasal polyposis	Unilateral disease
Characteristic CT findings	Bone erosion
Eosinophilic mucin without invasion	Fungal cultures
Positive fungal stain	Charcot-Leyden crystals Serum eosinophilia

Table 2: Kupferberg endoscopic sinus grading system.

Stage	Endoscopic finding
I	Normal mucosa
Ii	Mucosal edema / allergic mucin
Iii	Polypoid edema / allergic mucin
Iv	Sinus polyps / fungal debris

The Mackay classification was considered for the CT scans to evaluate the chronicity of the sinusitis.[14]

The patients were later subjected to diagnostic nasal endoscopy for visualizing the disease pattern.

The patients CT (Computed Tomography) of paranasal sinuses were taken for finding the extent and nature of disease.

Raised eosinophil count in peripheral smear and absolute eosinophil count, were considered preoperatively, along with the other blood investigations.

The patients were subjected to skin prick testing and IgE sensitivity for allergy testing.

The patients were later subjected to functional endoscopic sinus surgery.

Disease was removed extensively using the necessary surgical instrumentation.

Postoperative HPE was performed. Patients were followed up after giving steroid at 1 mg/Kg body weight initially for 1 week, after patient advised to do budesonide (0.5 grams respules in half liter saline) nasal wash for 6 weeks followed by intranasal steroid sprays for 1 year and antifungal (Itraconazole at 200 to 400 mg per day was used for 4 weeks) were used in recurrent cases. Postoperative IgE was measured as a marker for AFRS after 3 months.

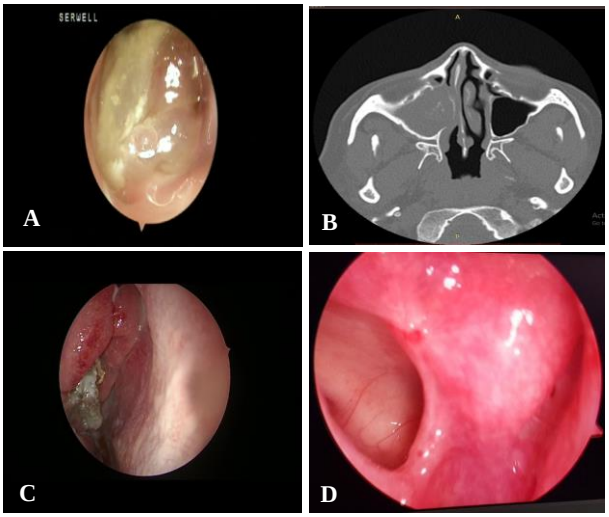

Figure 1: Images of a case of right side fungal sinusitis. (A) Preoperative diagnostic nasal endoscopy: shows fungal hype and polyps; (B) preoperative CT scan pictures: axial CT showing unilateral sinus opacification by heterogeneous density, characteristic of AFRS; (C) fungal debris coming from right maxillary sinus intra operativelyd; (D) postoperative diagnostic nasal endoscope shows healthy mucosa in rt maxillary sinus.

Figure 2: Coronal CT showing bilateral sinus opacification of recurrent AFRS case.

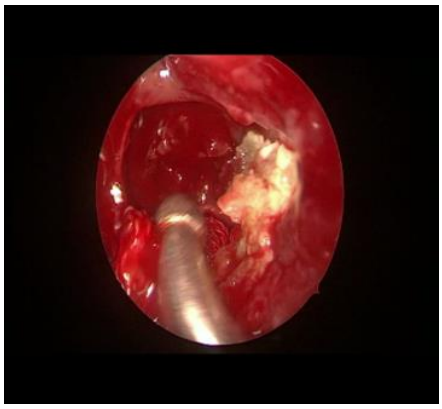

Figure 3: Fungal debris coming from left maxillary sinus intra operatively.

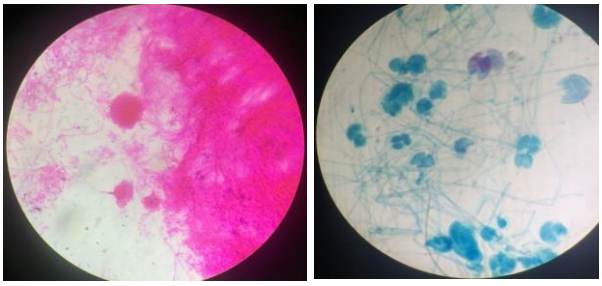

Figure 4: Histopathological examination pictures showing fungal hyphae.

RESULTS

In our study 28 patients of Allergic fungal rhinosinusitis taken from July 2016 to July 2017 in RIMS Medical College and Govt Hospital and our observations and results are as below.

Age

The age distribution was found to be between 17 and 60 years.

Majority of the patients were found to be involved in 21–40 years of age group.

The mean age for the study was found to be 32years and the median was found to be 39years.

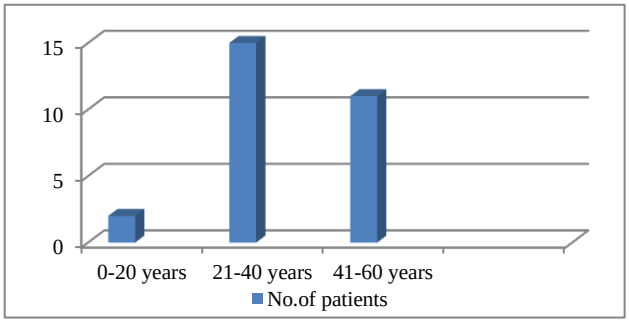

Figure 5: The following graph depicts the age distribution of the patients in the study.

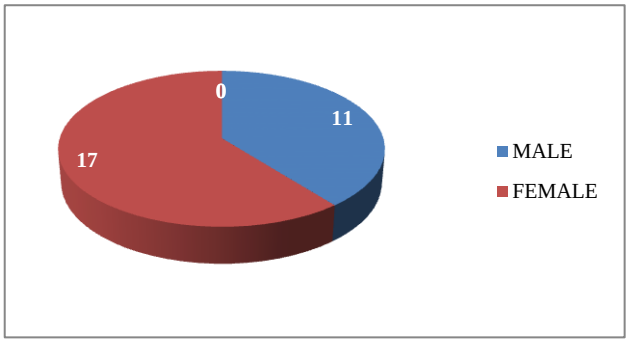

Figure 6: The following graph depicts the sex distribution in the study.

Sex distribution

The current study shows more of a female preponderance. Of the 28 cases 17 were found to be female and 11 were found to be male.

The female to male ratio was found to be 1.5:1.

Sinus distribution

The sinus distribution pattern in the current study is as follows:

Maxillary sinus involved in 26 cases, Ethmoid sinus involved in18 cases, Sphenoid sinus involved in 7 cases and frontal sinus involved in 7 cases.

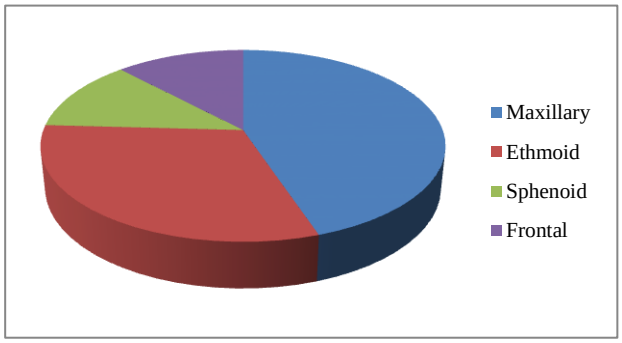

Figure 7: The following graph depicts the sinus distribution pattern of AFRS.

Laterality of disease

In our study, 21 cases disease present unilateral, in 7 cases disease present bilaterally.

Table 3: The following table depicts the Laterality of sinus disease.

	Number of cases
Unilateral	21
Bilateral	7

Postoperative findings of fungal disease

Of the 28 cases studied the following was the distribution pattern of fungi involved:

In our study after Histopathological examination *Aspergillus fumigates* was found in 16 cases and *Aspergillus flavus* was found in 12 cases.

Postoperative diagnostic nasal endoscopic pictures

Patient follows up

The patients were followed up regularly up to 1 year of the study.

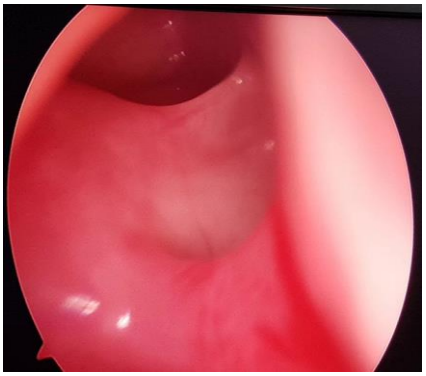

Figure 8: Post operative endoscopic appearance in a patient with AFRS with heathy mucosa of ethmoid sinus.

19 patients showed complete cure and 9 patients showed recurrence.

For the patients with recurrence, revision surgery was done and steroids therapy and itraconazole was started at 200-400 mg /day for 4 weeks.

DISCUSSION

Allergic fungal sinusitis is a noninvasive form of fungal rhinosinusitis with higher incidence in high humidity areas. Itcharacterizes more of a hypersensitivity response to the presence of extra mucosal sinus fungal hyphae; with a noticeablecomponent of fungal-specific type I immediate hypersensitivity though the disease appears complex and probable involves the relationship of various inflammatory modalities

In our study most of the patients were young with a mean age at presentation 32 years and most of them were in 2nd and 3rddecade of life, which is similar to studies reported in the Literature.[15,16]

The male female ratio is 1:1.5, similar male female ratio reported by Scott C Manning.[11]

In our study most common sinus involved is maxillary sinus followed by ethmoid sinus, sphenoid sinus and frontal sinus

In our study the disease was unilateral in 21 (75%) patients and bilateral in 7 (25%) patients Bent & Kuhn, Sohailet al and Thahimet al also reported unilateral predominance in allergic fungal sinusitis.[12,17,18]

The 28 patients in the study were subjected to FESS surgery; post operatively all the patients were reviewed with diagnostic nasal endoscopy.

The postoperative DNE was assessed according to Kupferberg DNE grading system.

19 patients showed complete cure and 9 patients showed recurrence.

For the patients with recurrence, revision surgery was done and steroids therapy and itraconazole was started at 200-400mg /day for 4 weeks.

The usage of antifungals has shown no specific improvement of AFRS.

This is in compliance with Ferguson et al.[19]

Rather an initial improvement was seen on usage but the disease has reverted back to it‘s original course indicating no specific role of antifungal therapy for AFRS.

The postoperative patients were then subjected to IgE sensitivity after a period of 3 months who showed a remarkable decrease in levels following surgery and medical treatment.

CONCLUSION

Allergic fungal rhinosinusitis is a disease on the rise. Prompt diagnosis and timely intervention is known to subside the disease and would prevent its recurrence.The usage of antifungals has shown no specific improvement of AFRS.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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