ABSTRACT

Objective: To determine the frequency of Allergic fungal sinusitis in patients with nasal polyposis. Various anatomical risk factors such as deviated nasal septum, turbinate hypertrophy & co morbid conditions like asthma, diabetes mellitus were also studied.

Study design: This is cross-sectional descriptive study.

Place and duration of study: The study was conducted at ENT Department of Liaquat National Hospital Karachi, from 21st July 2004 to 21st July 2005.

Patients and methods: 100 patients with nasal polyps were evaluated and operated. Specimens were sent for histopathology and culture examination.

Results: The frequency of AFRS was about 24%. Presence of gross deviation of nasal septum and bilateral inferior turbinate hypertrophy was seen in 4 (16.7%) and 5 (20.8%) patients respectively. On evaluating co-morbid conditions 5 (20%) patients were asthmatic and only 1 patient was diabetic.

Conclusion: Allergic fungal sinusitis is a common condition in patients with nasal polyps. In our study, one fourth of the cases had AFS. 20% patients had history of asthma and 4% had diabetes. Anatomical variations were seen in only few patients.

Key words: Allergic fungal sinusitis (AFS), Allergic bronchopulmonary aspergillus (ABPA)

INTRODUCTION

In 1976 Safirstein noticed that combination of nasal polypi and crust formation and sinus culture yielding aspergillus, had a clinical similarity of finding shared with allergic bronchopulmonary aspergillus (ABPA). Eventually this disease comes to known as allergic fungal rhino sinusitis (AFS). Allergic fungal sinusitis is generally recognized as a disease distinct from other forms of chronic rhino sinusitis. It is invariably associated with nasal polyps. Patients with chronic sinusitis have high probability to develop allergic fungal sinusitis. The sociodemographic factors appear to have a significant impact on the incidence and frequency of allergic fungal sinusitis. Exact pathophysiology of the disease remains unclear. One popular theory by Manning and colleagues is based on the assumption that several interrelated factors and events lead to development and perpetuation of the disease. First an atopic host is exposing to fungi through normal nasal respiration, which are the initial antigenic stimuli. Gel and Coombs type I (IgE) and type III (immune complex) mediated reaction then triggers an intense eosinophilic inflammatory response. The resulting inflammation leads to blockage of the ostia, which may be aggravated by certain anatomical factors such as deviated septal cartilage, turbinate hypertrophy. So ultimately with the blockage of the sinus ostium favors the environment for the proliferation of the fungus. Thus increasing the antigen exposures the end result of this cycle is the formation of allergic mucin, the material that fills the involved sinuses of the patient with AFS. Allergic mucin is a thick tenacious and highly viscous material in consistency, greenish to yellowish in color, usually encountered at the time of surgery and thought to be the hallmark of disease. Diagnosis is based on diagnostic criteria by the bent and kuhan in 1994 and demonstrated five common characteristics:

1: Type I (IgE mediated) hypersensitivity.
2: Nasal Polyposis.
3: Characteristic radiographic findings.
4: Eosinophilic mucin
5: Positive fungal stain.

Treatment options are

A: Medical Treatment:
1: Steroid therapy.
2: Immunotherapy.
3: Antifungal therapy.

B: Surgical Treatment: Complete removal of the disease and marsupialization of the involved sinus is the mainstay of treatment. Although a great deal of foreign studies has been done regarding incidence and diagnosis of allergic fungal sinusitis, but only few of literature references are available in local journal. As this needs to be highlighted. Hospital data reflects the serious nature of disease & its frequency in our population. Therefore this study to see the frequency of allergic fungal sinusitis in our population and risk factors associated with nasal polyps.
PATIENTS AND METHODS

100 patients with nasal polyps were included. After informed consent, the patients were selected from ENT out patient clinic, from emergency department and referred from other specialities were admitted and included in our study.

All patients were evaluated by taking a detailed history and clinical examination, Clinical examination was carried out by residents and consultant by using well illuminated head light and nasal speculum, findings were confirmed by fibroptic flexible or rigid endoscope, which gives direct vision of the nasal cavity and associated pathology like deviated septum or turbinate hypertrophy, was noted.

As a pre-op prerequisite laboratory investigations including complete blood count, urea, electrolyte, ECG, x-ray chest for general anesthesia fitness were done. CT scans were advised in 95% cases, to see the involvement of the sinuses, bony erosion, osteomeatal complex, turbinate hypertrophy, deviated nasal septum and intracranial & intraorbital extension. MRI scans were also advised in (5%) cases, where the disease was suspecting into intraorbital and intracranial regions.

Patients who presented in ENT department and were diagnosed as having nasal polyposis are included in this study. Gender. Both male and females are included in this study. Patients having nasal polypi and suffering from diabetes mellitus, asthma were also included in this study.

Those patients who refused surgery and biopsy were excluded from this study. The plan of surgical procedure was decided according to the extent of disease and by getting the opinion of radiologist and getting their reports as well. General anesthesia was given in all cases. To minimize recurrence of disease, treatment of AFS was directed at removal of nasal polyps, allergic mucin and debris. Surgery can be accomplished through a number of approaches and techniques. We commonly used following approaches:
1) Endoscopic sinus surgery.
2) Intranasal Ethmoidectomy.
3) External Ethmoidectomy.
4) Caldwell Luc’s operation.

After clearance of the disease the specimens were collected for histopathology in formalin solution and culture specimen was sent in a normal saline sterile bottles. As the report of histopathology and culture came post-operative treatment plan was decided. Final diagnosis was made on histopathology and culture reports. For simplifying the calculations and results, patients were divided into two broad groups.
(A) Allergic fungal sinusitis.
(B) Non allergic fungal sinusitis.

Data was analyzed by using SPSS version 10 on computer. Descriptive statistics like frequency and percentage were computed for categorical variable like, AFS, gender and associated co-morbid conditions like asthma, diabetes, clinical presentation, like unilateral or bilateral nasal polyps, deviated nasal septum, turbinate hypertrophy, proptosis, diplopia, various surgical approaches used and final histopathology, culture results. Mean and standard deviation were computed for quantitative variable like, age. Statistical test of significance is not applicable for the descriptive type study. Occurrence of this disease was conducted.

RESULTS

Out of 100 patients 61 were males and 39 were females with the mean age of 33 years and age ranges between 6 and 94 years. All patients presented with nasal polyps. The frequency of AFS was about 24% and rest of 76 had other pathology.

In 24 cases of AFRS mean age was 24 years, with range from 11 to 48 years. Male to female ratio was 1:1, as shown in table: 1.

Table I. Genders:

<table>
<thead>
<tr>
<th>Gender</th>
<th>AFS (%)</th>
<th>Total</th>
<th>Non AFS (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>12/24</td>
<td>50%</td>
<td>49/76</td>
<td>65%</td>
</tr>
<tr>
<td>Female</td>
<td>12/24</td>
<td>50%</td>
<td>27/76</td>
<td>35%</td>
</tr>
</tbody>
</table>

Table II. Clinical presentation in Allergic fungal sinusitis:

<table>
<thead>
<tr>
<th>Clinical features</th>
<th>n</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilateral polyps</td>
<td>16</td>
<td>66.7</td>
</tr>
<tr>
<td>Unilateral polyps</td>
<td>08</td>
<td>33</td>
</tr>
<tr>
<td>Proptosis</td>
<td>08</td>
<td>33</td>
</tr>
<tr>
<td>Diplopia</td>
<td>08</td>
<td>33</td>
</tr>
<tr>
<td>Turbinate hypertrophy</td>
<td>05</td>
<td>20</td>
</tr>
<tr>
<td>Deviated nasal septum</td>
<td>04</td>
<td>16.7</td>
</tr>
</tbody>
</table>

All patients underwent through surgical procedure like functional endoscopic sinus surgery alone was done in 12/24 (50%) cases while in 5(21%) cases
Frequency of Allergic Fungal Sinusitis in Patients with Nasal Polyps

external fronto-ethmoidectomy was done. Intranasal ethmoidectomy was done in one patient only. Combination of two approaches like External frontoethmoidectomy and Caldwell luc’s procedure was done in 4 (17%) cases, Caldwell luc’s operation. Septoplasty and endoscopic sinus surgery in combination were used on 4 (17%) cases, table: 3.

Final histopathology was chased. Out of 100, 24 patients were reported as non-invasive allergic fungal sinusitis with no evidence of tissue invasion seen in the examined material. Aspergillus was recovered on culture in 17 (70%) cases and no fungal growth was reported in 07 (30%) cases.

Table III: Surgical approaches were used in allergic fungal sinusitis

<table>
<thead>
<tr>
<th>Procedures</th>
<th>n</th>
<th>%age</th>
</tr>
</thead>
<tbody>
<tr>
<td>External frontoethmoidectomy</td>
<td>05</td>
<td>21</td>
</tr>
<tr>
<td>Intranasal Ethmoidectomy</td>
<td>01</td>
<td>4</td>
</tr>
<tr>
<td>Functional endoscopic sinus surgery</td>
<td>12</td>
<td>50</td>
</tr>
<tr>
<td>Combination*</td>
<td>02</td>
<td>08</td>
</tr>
<tr>
<td>Functional endoscopic sinus Surgery + Septoplasty</td>
<td>04</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>100</td>
</tr>
</tbody>
</table>

*Combination: Two surgical approaches combine: External frontoethmoidectomy, Caldwell luc’s operation.

Rest of 76 patients had non-AFS pathology, 62 were reported as simple inflammatory nasal polyps and remaining 14 patients were diagnosed as invasive fungal sinusitis, as shown in figure: 1 where vertical limb shows number of patients.

Figure: 1

**DISCUSSION**

Allergic fungal sinusitis is a distinct clinical entity with non-specific symptoms. The incidence of AFS is apparently more than what is reported in international literature. The incidence of AFS was approximately 7% of all chronic sinusitis cases requiring surgery. Review of literature reveals that incidence of AFS is higher in temperate regions of relatively high humidity. Over the past 2 decades, allergic fungal sinusitis (AFS) has become increasingly defined.

One local study also reported 14% frequency of AFS. AFS was seen in 24 patients out of 100, with nasal polyps, so the frequency of AFS is higher in this study (P<0.05). Comparing our results with national and international researchers was most commonly seen in adolescent, immunocompetent individuals, with an equal male to female distribution. Cody and his colleagues also reported this.

Important finding in this study was that most of the patients belonged to a middle and poor class and are residents of Karachi. Majority of the patients presented with bilateral nasal obstruction 66.7%, sleep disturbances, headaches, and visual disturbances was seen in 33.2%. While on presentation 8 (33.3%) cases had proptosis and affected vision after taking eye review from the eye consultant. The disease was unilateral 33.3% and in 66.7% it was bilateral. Patients presented with nasal polyps had history of asthma (20%); anatomical abnormalities like DNS, turbinate hypertrophy but it had no significant correlation with AFS Goldstein also reported history of atopy in one third of the patients and a history of asthma in another third with AFS.

Nasal polyps had strong association with AFS, which had been reported by Yousuf M M, and his colleagues. Radiological evaluations revealed multi sinus involvement with areas of attenuation surrounded by an area of hypo density in majority of our cases. Chronic bone changes can be picked on CT Scan. MRI scan is also helpful in advance disease to see, intracranial or intraorbital extension of disease, corresponding to low T1 weighted and high T2 weighted signal intensities. It is suggested that CT should be used as first modality of imaging. Surgery has played an important role in the management of AFS. McGuirt stated, “Without question, the treatment of paranasal sinus aspergillosis is surgical. The key to successful surgical treatment is the removal of diseased mucosa and aeration and drainage of involved sinus.” Surgical approaches should be tailored according to individual need. Endoscopic sinus surgery is preferable over the conventional surgical approaches. Endoscopic powered instrumentation has demonstrated its effectiveness, i.e. the ability of this technique to remove soft tissue and thin bone under direct vision. Out of 24 we performed endoscopic surgery in half of the cases. External approaches were used where the disease was extensive involving frontal sinus, orbit and intracranial regions. External frontoethmoidectomy was done in 5
(21%) cases while intranasal ethmoidectomy done in 1 patient only. Combination of external ethmoidectomy and clad well lac’s procedure was done in 2 cases. During endoscopic clearance of nasal polyps septoplasty was done in 4 (17%) cases. Allergic mucin which was thick and tenacious; color ranged from tan to green or black, encountered in one third cases intraoperatively, was very helpful in making diagnosis, surgical sinus clearance specimens were sent for histopathology and finally reported as AFS, with no fungal invasion seen. Positive culture was reported in two third of our cases. This was in concordance with international literature where reported cases of positive fungal culture vary between 60-100%.

It is important to realize that diagnosis of AFS is not established or eliminated on the basis of the results of fungal cultures. In those cases where external approaches were used the wound was stitched in two layers and stitches were removed after a week. Topical nasal steroids were started at the first postoperative visit and continued for rest of 3 months and then used as needed. Most of the patients had improvement in symptoms of vision, headaches, and nasal obstruction. After being discharged, all patients were called back for follow up after one week. Most of the patients did not show the recurrence of disease follow up 06 monthly for a period of 1 year after surgery done. The severity of the disease was reduced but few patients still had a complaint of nasal discharge. Recurrence of nasal polyps was seen in 3 (12.5%) cases only.

CONCLUSION

Allergic fungal sinusitis is not a rare condition. In our study one fourth of the cases had AFS. Fungal infection should be considered in all patients with chronic sinusitis. Early diagnosis and proper treatment provides rewarding results. Failure to recognize the AFS may result in complication such as blindness and intracranial abscess; which is unfortunately seen in our patients. We still observed patients with far advanced disease having proptosis and visual disturbances and intracranial complications.

REFERENCES