

Allergic Fungal Rhinosinusitis in Patients with Nasal Polyposis

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ABSTRACT:

BACKGROUND:

Nasal polyps are considered to be the end results of a chronic inflammatory process in the sinonasal mucosa which are commonly seen in our routine ENT practice. Allergic fungal rhinosinusitis may be present with unilateral or bilateral polyps, it is important to be aware of the prevalence of allergic fungal rhinosinusitis in patients with nasal polyps.

OBJECTIVE:

To determine the frequency of allergic fungal rhinosinusitis among patients having nasal polyposis.

METHODS:

This is a descriptive cross-sectional study carried out in Department of Otolaryngology, Head and Neck Surgery, Ghazi Al-Hariri Hospital for surgical sub-specialties, during October 2018 to October 2019. A total of 55 patients (31 male, 24 female) with nasal polyposis for at least 3 months were enrolled. All patients were assessed by detailed history, examination, investigation including total Ig E titer, and Computed tomography of the nose and paranasal sinuses. These patients underwent endoscopic sinus surgery and the specimens were sent for histopathology for identification of fungus.

RESULTS:

The mean age was (32.9±12.4) years. Nasal obstruction (100%) was recorded, smell disturbance (86%) and nasal discharge (84%) were the commonest clinical presentation. Out of 55 patients, fungal elements were detected by histopathological study in 20(36%) of patients.

CONCLUSION:

Allergic fungal rhinosinusitis is significantly associated in patients with nasal polyposis.

KEYWORDS: Nasal polyposis, Allergic fungal rhinosinusitis, Computed tomography

INTRODUCTION:

Nasal polyps are the oedematous sino-nasal mucosa prolapsing into the nasal cavity.⁽¹⁾ Polyps can vary widely in size and should be considered a bilateral condition.⁽²⁾ Approximately 80% of patients with fungal sinusitis have nasal polyps.^(3,4) Theories on pathogenesis include hypersensitivity and T-cell mediated reactions as well as a humeral immune response.⁽²⁾ Fungal rhinosinusitis (FRS) can be categorized into two groups; invasive and non-invasive.⁽⁵⁾ Acute or fulminant invasive FRS is a life-threatening disease present usually in immunocompromised patients. *Aspergillus* species and the fungi in the order of mucorales (e.g. *Rhizopus*, *Rhizomucor* and *Mucor*) are the most commonly implicated species.⁽⁵⁾ Chronic invasive FRS is a slowly destructive disease with a time-course of more than 12 weeks duration.⁽⁶⁾ Allergic FRS is a distinct clinicopathological entity with in CRS that increasingly recognized.⁽⁷⁾ The total IgE levels have been proposed as a useful indicator

of AFS clinical activity. Total IgE values are generally elevated in AFS, often to more than 1000 U/ml.⁽⁸⁾

The hallmark of AFRS is the presence of allergic mucin.⁽⁹⁾ The presence of a positive fungal culture in AFRS patients ranged from 49 to 100%, depending on the culture method used.⁽⁵⁾ The histologic appearance of eosinophilic mucin in combination with other clinical factors remains an important indicator of AFRS.⁽⁷⁾

AIM OF THE STUDY:

To determine the frequency of allergic fungal rhinosinusitis among patients having nasal polyposis.

PATIENTS AND METHODS:

The study was conducted in Department of Otolaryngology, Head and Neck Surgery / martyr Ghazi al-Hariri Hospital for surgical sub-specialties, Baghdad. A descriptive cross-sectional study for 55 patients (31 male, and 24 female) who underwent endoscopic sinus surgery for nasal polyposis during October 2018 to October 2019. The patients were collected from the outpatient clinic and from private clinic.

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FUNGAL RHINOSINUSITIS NASAL POLYPOSIS

Inclusion criteria

1. Patients with unilateral and bilateral nasal polyposis that persist for three months.
2. Patients have no contraindication for general anesthesia.

Exclusion criteria

1. Immunocompromized patients.
2. Patients with sinonasal benign or malignant neoplasms.
3. Patients with invasive fungal rhinosinusitis.
4. Polypectomy done under local anaesthesia that may affect the accuracy of our results.

Assessment

Assessment done by routine clinical and endoscopic examination, routine investigations and non contrast CT scan of nose and paranasal sinuses to demonstrate the anatomy and the severity of disease.

Surgical procedures

All these patients underwent FESS in routine way, which included complete removal of polyp

and diseased mucosa and allergic mucin if present from involved sinuses and creating wide access to these sinuses for ventilation and postoperative care.

Statistical analysis

All values were presented as mean±SD. SPSS (Statistical Package for the Social Sciences) version24 soft-ware were used to organize and analyze the data. Chi square test were used to test the significance of the difference. Categorical data expressed as frequencies and percentages. P value less than 0.05 was regarded as significant.

RESULTS:

The results showed that the group of (21-30 years) had largest number of patients . the mean age of studied patients was (32.9±12.4) years. The mean age of patients with AFRS was (33.17± 12.35) years. The M:F ratio of studied patients was 1.29:1, whereas for those with AFRS, it was 0.82:1. (Table 1)

Table 1: Demographic of the study.

	Non-fungal (No.=35)	AFRS (No.=20)	p-value
Age (mean±SD)	32.9±12.4	33.17± 12.35	0.62
Gender	Male	22 (62.8%)	0.472
	Female	13 (37.2%)	

The most common symptom was nasal obstruction which found in all patients, followed by smell disturbance in 47 (86%), and nasal

discharge in 46 (84%) of patients, shown in figure 1.

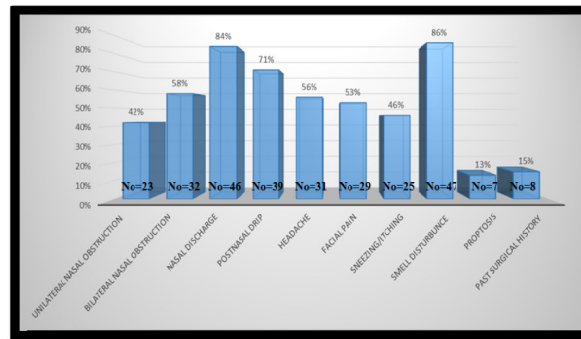


Figure 1: Distribution of patients according to symptoms.

Endoscopically, bilateral nasal polyps was the most common finding in 38(69%) of patients,

while least common finding was unilateral nasal polyps 17(31%) , shown in figure 2.

FUNGAL RHINOSINUSITIS NASAL POLYPOSIS

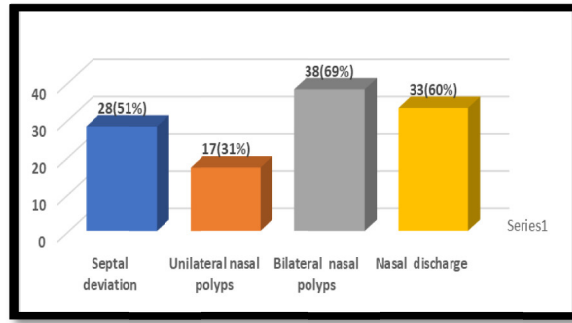


Figure 2: Endoscopic examination findings.

The prevalence of diseased sinus by CT scan was showed in figure 3.

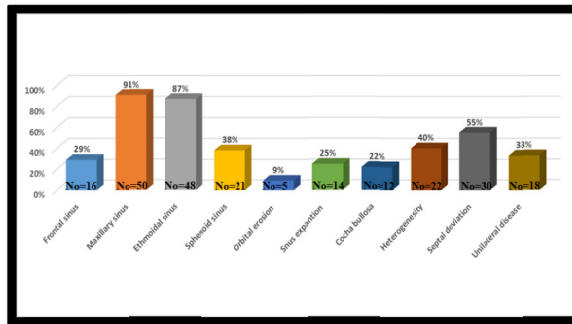


Figure 3: CT scan findings.

There were 11(20%) patients got history of asthma, 5(9%) patient history of aspirin intolerance and 4(7%) patient had Samter's triad and these without association to fungal infection

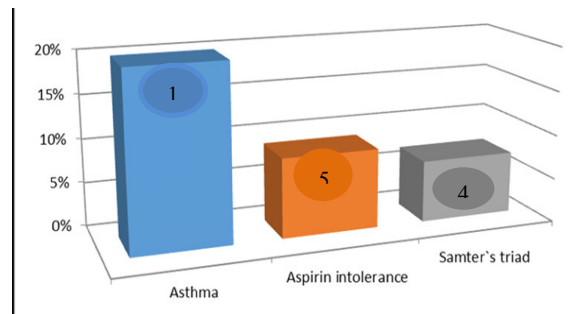


Figure 4: Association between nasal polyposis, asthma and aspirin sensitivity.

Regarding laboratory findings, The total IgE level >1000 iu/ml seen in 25(45%) of patients, and all patients who have allergic fungal rhino sinusitis has increase total IgE with highly significant association, (P=0.001).

FUNGAL RHINOSINUSITIS NASAL POLYPOSIS

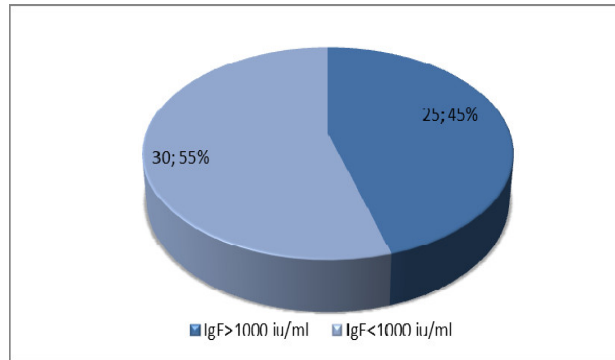


Figure 5: Laboratory findings.

The prevalence of allergic fungal rhinosinosis of total studied patients by histopathological results was 36%.

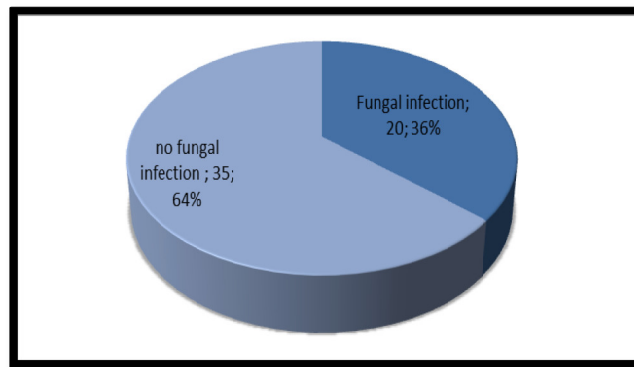


Figure 6: Prevalence of allergic fungal rhino sinusitis.

DISCUSSION:

In this study, the mean age was (32.9 ± 12.4) years, and the largest number of patients having AFRS was found in age group (21-30 years). A study conducted by Muhammad Irshad-ul-Huq et al.,⁽¹⁰⁾ mean age of the patients was 31.56 ± 6.18 years and highest incidence rates were the age 21-30 years, which is similar to our study. Also a study was conducted by Baloach ZA et al.,⁽¹¹⁾ on allergic fungal sinusitis in which the mean age was 27.3 ± 12.98 years ranging from 9 to 64 years. The mean age of the patients in this study was higher than study of Tahim K et al.,⁽¹²⁾ which was 20.75 years, and Main et al.,⁽¹³⁾ which was 24 years.

Regarding the gender distribution in our study the females with AFRS were affected more in percent than males, this like the results of Baloch ZA et al.,⁽¹¹⁾ observed that females predominant. However, in contradiction with studies Tahim K et al.,⁽¹²⁾ and Main et al.,⁽¹³⁾ found male preponderance ratio of 3:1 and 7:3.

In this study all the patients were found to have nasal obstruction. While a study by Zakirullah et al.,⁽¹⁴⁾ found nasal obstruction in (96%) of patients.

The study showed 8(15%) had history of previous sinonasal surgery for nasal polyposis, and a study by Zakirullah et al.,⁽¹⁴⁾ found 9(39%) with previous sinonasal surgery.

There were 20 patients had finding consistent with AFRS, and the disease was unilateral in (55%) patients and bilateral in (45%) patients, this with agreement with studies of Tahim K et al.,⁽¹²⁾ and with Bent and Kuhn⁽¹⁵⁾, reported unilateral predominance of AFRS. On the other hand Bradley Marple⁽¹⁶⁾, found bilateral disease in 51%.

Intraoperative finding showed the characteristic thick peanut-butter allergic mucin and extensive polyposis in all patients with AFRS. These are similar notes seen on study of Schubert⁽¹⁷⁾ and Gupta AK et al.,⁽¹⁸⁾.

In our study asthma was found to be associated with nasal polyposis in 11(20%), and Aspirin intolerance in 5(9%). In a study conducted by Laila M Telmesani on 91 patients found asthma in 25(27.5%) of patients⁽¹⁹⁾. Kim JE report that 4.8% of patient undergone functional endoscopic sinus surgery had Samter's triad⁽²⁰⁾.

The total IgE elevated in 25(45.5%), and all patients who diagnosed as fungal rhinosinusitis have total IgE significantly higher than those with simple inflammatory polyps. These results are in agreement with studies of Laila M Telmesani⁽¹⁹⁾ and Ferguson⁽²¹⁾.

CT scan findings was agreement with study conducted by Zakirullah et al,⁽¹⁴⁾ in which the CT scan findings suggested 70% unilateral disease involvement of nose and paranasal sinuses, and a study by Bhardwaj et al,⁽²²⁾. Also, CT scan showed that all cases with AFRS revealed double density sign and most involved sinuses in AFRS was maxillary sinus then ethmoid sinuses, and frontal sinus was the least involved. This is agree with study conducted by Bhardwaj et al,⁽²²⁾ in which CT scan revealed double density sign in all cases with maximum involvement of maxillary sinus (96%) followed by the ethmoid sinuses (90%) then sphenoid and frontal sinuses in descending order of incidence.

The expansion of the involved sinus in AFRS patients was found in 85% and orbital erosion in 9%, none of our patients had intracranial erosion, while Gupta et al,⁽¹⁸⁾ showed expansion of the involved sinus in all cases and 20.5% of their patients, that had an evidence of the intra orbital erosion and intracranial erosion was found in 17.6% of cases.

The histopathological study showed that 36% were proven to have AFRS and rest of 64% patients had non-AFRS were reported as simple inflammatory nasal polyps. While a study was performed by Telmesani⁽¹⁹⁾, histopathological diagnosis was positive for AFRS in 11 of 91 patients, and a study by Baloch et al,⁽¹¹⁾ 50 patients with nasal polyposis were evaluated for AFRS, fungal infection was confirmed in 38%. This variation in the results between studies may be due to geographic variation in the prevalence of AFRS.

CONCLUSION:

Our study revealed that significant proportion of patients with nasal polyposis also have AFRS. Every patient with nasal polyposis should be evaluated for the presence of fungi. Preoperative evaluation of patients with CT scan of nose & PNS is important for preoperative diagnosis of AFRS. Measurement of serum total IgE is

important as it is elevated in all patients with AFRS.

Recommendations

All patients with nasal polyposis biopsy should send for histopathological study because AFRS is significantly associated with nasal polyposis. As AFRS associated with more extensive polyposis a full house technique with wide surgical exposure of sinuses is recommended for successful clearance of the sinuses and decrease the polyp recurrence. Endoscopic assessment of operative site and clearance of crusts and retained debris should be conducted at every follow up visit and we recommend use of postoperative steroid and nasal wash to decrease the chance of recurrence. Further study of larger sample and longer time for more accurate assessment of results.

REFERENCES:

1. Giles Warner, Andrea S. Burgess, Suresh Patel, Pablo Martinez-Devesa, Rogan Corbridge. OXFORD SPECIALIST HANDBOOKS Otolaryngology and Head and Neck Surgery. 2009; 21: 580-81.
2. Melia L. Nasal Polyposis. In: Watkinson JC, Clarke RW. Scoot- Brown's otorhinolaryngology Head and Neck Surgery. 8th ed. London: Taylor and Frances Group: 2018:1038-43.
3. Ryan MW. Chronic Rhinosinusitis with Nasal Polyposis. In: Johnson JT, Rosen CA. Bailey's Head and Neck Surgery Otolaryngology. 5th ed. Philadelphia: Wolters Kluwer. 2014: 525-32.
4. Hedman J, Kaprio J, Poussa T, Nieminen MM. Prevalence of asthma, aspirin intolerance, nasal polyposis and chronic obstructive pulmonary disease in a population-based study. *Int J Epidemiol*. 1999;28:717-22.
5. Gan EC, Javer AR. Fungal Rhinosinusitis. In: Watkinson JC, Clarke RW. Scoot- Brown's otorhinolaryngology Head and Neck Surgery. 8th ed. London: Taylor and Frances Group: 2018:96:1047-57.
6. Ni Mhurchu E, Ospina J, Janjua AS, Shewchuk JR, Vertinsky AT. Fungal Rhinosinusitis: A Radiological Review with Intraoperative Correlation. *Can Assoc Radiol J*. 2017;68:178-86.
7. Adelson RT, Marple BF, Ryan MW, Aynehchi BB, Har-El G. Fungal Rhinosinusitis. Bailey's Head and Neck Surgery Otolaryngology. 5th ed. Philadelphia: Wolters Kluwer. 2014:37:557-71.

8. Marple BF. Allergic Fungal Rhinosinusitis : Current Theories and Management Strategies. *Laryngoscope*. 2001;111:1006-19.
9. Marple BF. Allergic fungal rhinosinusitis: a review of clinical manifestation and current treatment strategies. *Med Mycol*. 2006; 44:S277–84.
10. Gupta RP, Bahadur S, Thakar A, Handa KK, Sarkaar C. Management protocols of Allergic Fungal Sinusitis. *Indian J Otolaryngol Head Neck Surg*. 2007; 59:35-40.
11. Irshad-ul-Haq M, Farooq M, Qadri SH. Prevalence of allergic fungal sinusitis among patients with nasal polyps. *JSZMC* 2014;5:690-92.
12. Baloch ZA, Ahmad AN, Mahmood Z, et al. Frequency of allergic fungal sinusitis in patients with nasal polyps and its causative species. *Pakistan Journal of Otolaryngology* 2010;26:76-77.
13. Mian MY, Kamal SA, Senthikumaran G, Abdullah A, Pirani M . allergic fungal Rhinosinusitis :current status *Pak J Otolaryngol* 2002;18:36-4.
14. Zakirullah, Nawaz Ghareeb and Sattar Syed Fazle . Presentation and diagnosis of allergic fungal sinusitis. *J Ayub Med Coll Abbottabad* 2010; 22:53-57.
15. Bent JP 3rd, Kuhn FA. Diagnosis of allergic fungal sinusitis. *Otolaryngol Head Neck Surg*. 1994; 111:580-88.
16. Marple BF, Mabry RL. Allergic fungal sinusitis: Learning from our failures. *Am J Rhinol* 2000; 14:223–226.
17. Schubert MS. Allergic fungal sinusitis. *Otolaryngol Clin North Am* 2004; 37:301-26.
18. Gupta RP, Bahadur S, Thakar A, Handa KK, Sarkaar C. Management protocols of Allergic Fungal Sinusitis. *Indian J Otolaryngol Head Neck Surg*. 2007; 59:35-40
19. Laila M. Telmesani. Prevalence of allergic fungal sinusitis among patients with nasal polyps. *Ann Saudi Med*. 2009;29:212-14.
20. Kim JE, Kountakis SE. The prevalence of Samter's triad in patients undergoing functional endoscopic sinus surgery. *Ear Nose Throat J*. 2007; 86:396-99.
21. Ferguson BJ. Eosinophilic mucin rhinosinusitis :a distinctive clinicopathological entity. *Laryngoscope*. 2000;799-813.
22. Bhardwaj BB, Gill JS, Singh T. The role of CT scan and histopathology in diagnosis of allergic fungal sinusitis .*Clinic Rhinology :international journal* ,2014;7:117-20.