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**Research Article**

# Prevalence of allergic fungal rhino-sinusitis among patients with nasal polyps

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## ABSTRACT:

**Objective:** To determine the prevalence of allergic fungal rhino-sinusitis among patients with nasal polyps.

**Material and methods:** This cross sectional study was conducted at Department of ENT, DG Khan Hospital, DG Khan from March 2018 to September 2018 over the period of 6 months. Total 84 patients with nasal polyps either male or female. Allergic fungal rhino-sinusitis was assessed in selected patients.

**Results:** The mean age of the patients included in the study was 31.56 + 6.18 years. There were 56 (67 %) male patients in the study, while 28 (33%) patients were female. Female to male ration was 1:2. Nasal polyps were round in 78 (92.9%) patients, smooth in 81 (96.4%) patients, soft in 81 (96.4%) patients, translucent in 67 (79.8%) patients, pale in 58 (69%) patients and pedunculated in 81 (96.4%) patients. The staining and culture was positive for fungal hyphae in 9 (11%) patients while it was not positive in 75 (89%) patients.

**Conclusions:** Allergic fungal rhino sinusitis is seen commonly among patients with nasal polyps. So, every patient with nasal polyp should be evaluated for the presence of AFRS.

**Key words:** Allergic Fungal rhino sinusitis; Nasal polyp.

## INTRODUCTION

The nose represents the entrance of the respiratory tract. The several functions are dedicated to the nose that include: The passageway for the air stream, it harbors chemical sensory functions, it warms and moistens the air and it plays a very important role in the defense against foreign bodies of the surrounding environment.[1] Each nostril possesses its own blood supply and innervations which can be seen as two organs that usually work together but in several situations can be regulated separately. [2] Sometimes the nose looses its normal functions and leads to nasal symptoms. The most common of these symptoms is the nasal obstruction.[3]Nasal polyps refer to an abnormal edematous non neoplastic pedunculated swellings arising from the mucosa of nose and/ paranasal sinuses (commonly at the outflow tract of one or more of the sinuses) having fundus, body and stalk.[4] These are benign lesions. Having an uncertain etiology and tendency to recur, they represent a challenging diagnosis for the physician to treat.[5]

Nasal polyps are usually resulted from the chronic inflammation of the nasal and sinus mucous membranes. People who suffer from the nasal and sinus polyps frequently are very uncomfortable due to blocked nose etc. because these polyps may block nasal airways and create breathing difficulties or inhibit proper drainage of the sinus cavities, creating stagnant secretion and lead to sinusitis. Nasal obstruction due to polyps can also lead to hyposmia or even anosmia and with increased growth, by exerting pressure on bones, polyps may cause destruction of nasal and other facial bones and there may be orbital and intracranial complications. [6]

The true etiology of NP is unknown. Some theories consider polyps a consequence of conditions which cause chronic inflammation in the nose and the paranasal sinuses characterized by stromal edema and variable cellular infiltrate. [7]Historically it has been assumed that allergy predisposes to NP because symptoms of watery rhinorrhoea and mucosal swelling were present in both diseases along with an abundance of eosinophils in the nasal secretions.[8] However, epidemiological studies provide little evidence to support this relationship with NP, found in only 1-2% of patients with positive skin prick tests. [9] In addition studies have shown that NP is no more common in atopic individuals. Studies have also shown that total and specific IgE as well as other Allergic-type histological features of polyps are unrelated to positive skin prick tests but did correlate with the levels of eosinophils. [10] It therefore remains possible that the local allergic mechanism in the absence of systemic features could play a role in the pathogenesis of polyps.[11]An association between nasal polyps and fungal cultures has been established for many years. This recognition led to the term "Allergic Fungal Rhino-sinusitis" (AFRS).[11,12] In Allergic Fungal Rhino-sinusitis specific IgE has been established in nasal lavage fluid and eosinophilic mucin.[13] The prevalence of AFRS in Saudi Arabia is 12.1% in 2004 -2007.[14]

Fungal sinusitis refers to a spectrum of conditions that is caused by fungal infection of nose and paranasal sinuses.[15] This is a rapidly progressive disease that is usually seen among patients with diabetes mellitus and immune compromised patients.[16] Fungal sinusitis is not a rare disease now a day (incidence ranges from 4.4 % to 6.7% world wide).[17] In countries like Sudan, Saudi Arabia and southwestern states of USA, and in northern parts of India, this disease is endemic and its prevalence is increasing day by day.[18]

As prevalence of AFRS among patients with nasal polyps had not been estimated in Pakistan and due to the potential for disease complication in cases of AFRS, it was important to find the prevalence of this disease among patients with nasal polyps so that appropriate strategies could have been made to minimize the morbidity.

## OPERATIONAL DEFINITIONS:

**1. Nasal polyps:**

Grape like rounded, smooth, soft, translucent and pale masses in sinonasal cavity attached to nasal or sinus mucosa by pedicle seen on speculum examination (presence of 3 or more than 3 of above features) and confirmed on histopathology.

**2. Allergic Fungal Rhino-Sinusitis:**

Chronic rhino-sinusitis caused by fungus was confirmed by staining and culture of the sinonasal contents showing fungal hyphae and eosinophilic mucin.

**3. Chronic rhino-sinusitis:**

(Presence of 4 or>4 of followings for>3 months)

1- Nasal obstruction (partial/complete).
2- Post nasal discharge.
3- Recurrent (anterior) nasal discharge.
4- Attacks of sneezing (>3 sneezing/attack).
5- Disturbance of olfaction.

Headache. 7-CT scan PNS showing soft tissue density mass in Para nasal sinuses (PNS).

## MATERIAL AND METHODS

This cross sectional study was conducted at Department of ENT, DG Khan Hospital, DG Khan from March 2018 to September 2018 over

the period of 6 months. Total 84 patients presenting with nasal obstruction and suffering from nasal polyps of any size, severity and duration seen by speculum examination, either male or female having age 10-50 years were selected.Patients with friable nasal mass which bleeds on touch, patients using steroids (nasal/systemic) for more than 14 days were excluded from the study.

The diagnosis of AFRS was considered when fungal hyphae and eosinophilic mucin (both) were positive while for nasal polyps features of operational definition and positive H/P (both) were diagnostic. There could be bias in saving samples which was controlled by correct and immediate labeling (i-e sample 1 saved in formalin solution for H/P and sample 2 saved in 10% KOH solution for fungal staining and culture).

The data was entered in the SPSS version 16 and was analyzed through this software. Age was presented as mean and standard deviation. Stratification was done with regard to age, gender, features of nasal polyps, symptoms and signs, histopathological and radiological findings, to see the effect of these on outcome. The prevalence of allergic fungal rhino-sinusitis (AFRS) was measured by proportion method and the data was presented by bar charts. Sex distribution was presented by the pie charts.

## RESULTS

The total number of patients (n=84) included in the study were eighty four (including both males and females). The mean age of the patients included in the study was 31.56 + 6.18 years [range 11 – 50]. There were 22 (26.2%) patients of age range of 11 – 20 years, 28 (33.3%) patients of age range of 21 – 30 years, 18 (21.4 %) patient of age range of 31 – 40 years and 16 (19.1%) patients of age range of 41 – 50 years.Patients were also distributed according to sex. There were 56 (67 %) male patients in the study, while 28 (33%) patients were female. Female to male ration was 1:2.Nasal polyps were round in 78 (92.9%) patients, smooth in 81 (96.4%) patients, soft in 81 (96.4%) patients, translucent in 67 (79.8%) patients, pale in 58 (69%) patients and pedunculated in 81 (96.4%) patients.Nasal obstruction and post nasal drip was seen in all (100%) patients. Recurrent nasal discharge among 80 (95.2%) patients, sneezing was seen among 84 (100%) patients. Smell disturbance was seen among 70 (83.3%) patients and headache was seen among 65 (77.4%) patients.The radiological findings were positive in 81 (96%) patients while in 3 (4%) patient, the radiological findings were not positive for nasal polyps.Histopathology for nasal polyps was positive in 80 (95%) patients while in rest of 4 (5%) patients, this was not positive.

The staining and culture was positive for fungal hyphae in 9 (11%) patients while it was not positive in 75 (89%) patients.There were 9 (11%) patients in whom the diagnosis of allergic fungal rhino sinusitis was established, while rest of 75 (89%) patients did not have allergic fungal rhino sinusitis.

**Table 1:** Age distribution

| Age | No. of patients | Percentage |
|---|---|---|
| 11 – 20 | 22 | 26.2 |
| 21 – 30 | 28 | 33.3 |
| 31 – 40 | 18 | 21.4 |
| 41 – 50 | 16 | 19.1 |
| Mean + SD | 31.56 ± 6.18 | |
| Range | 11 – 50 | |

**Figure 1:** Distribution of patients by sex (n=84).

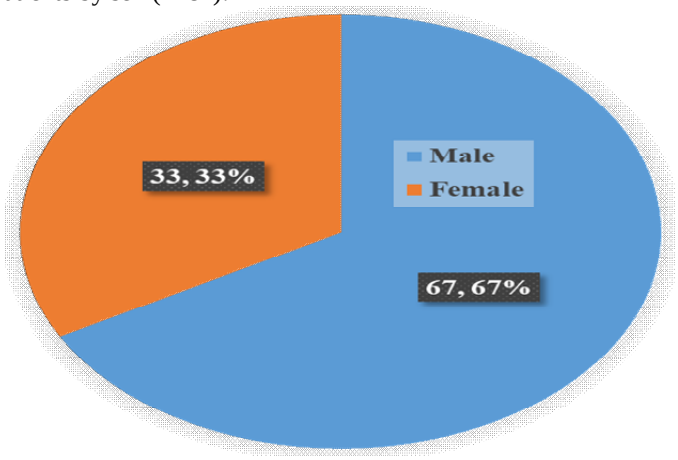


**Figure 2:** Distribution of patients by features of nasal polyps (n=84).

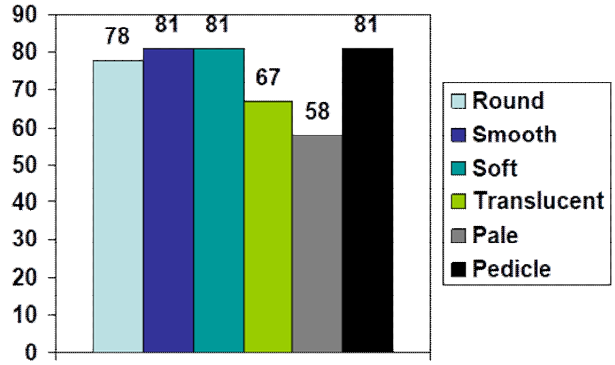


**Table 2:** Distribution of patients by Signs and symptoms

| Signs and Symptoms | No. | % |
|---|---|---|
| Nasal Obstruction | 84 | 100 |
| Post nasal discharge | `84 | 100 |
| Recurrent nasal discharge | 80 | 95.2 |
| Sneezing | 84 | 100 |
| Disturbance of smell | 70 | 83.3 |
| Headache | 65 | 77.4 |

**Table 3:** Frequencies for different diagnosis modalities

| Diagnosis modalities | Yes (%) | No (%) | Total |
|---|---|---|---|
| Radiological findings | 81 (96) | 3 (4) | 84 |
| Histopathological findings | 80 (95%) | 4 (5%) | 84 |
| Staining and culture for fungalhyphae | 75 (89%) | 9 (11%) | 84 |

## DISCUSSION

This was one of the larger studies including 84 patients conducted in to determine the frequency of AFRS among patients with nasal polyps. This study was conducted in an E.N.T Unit of a teaching hospital. The results of this study showed that allergic fungal rhino sinusitis was seen among 11% patients.

In literature, there are many studies on this context but the results of these studies are variable with each other.

In our study, the mean age of the patients was 31.56 $\pm$6.18 years ranging from 10 – 50 years. A

study was conducted by Baloach ZA, et al.[19] on allergic fungal sinusitis in which the mean age of the patients was 27.3 ±12.98 years ranging from 9 to 64 years. Eighty percent of the patients were below fifty years of age. The mean age of the patients in our study was higher than described by Thahim K, et al. [20] that was 20.75 years and Mian MY, et al. [21] which was 24 years. In study by Zakirullah, et al. [22] most of the patients were young with a mean age at presentation 20 years and 83% were in 2nd and 3rd decade of life which is also comparable to that in our study i.e. approximately 72.7% patients were in 2nd and 3rd decade of life.

Regarding the gender distribution in patients included in our study, there was a male preponderance with 33% female and 67% male (female to male ratio 1:2). This male preponderance is also confirmed by another study conducted at UT Southwestern, in children, male dominated (M/F ratio 2.1:1; average age=13 year) but in adults females dominated (M/F ratio 1:1.4; average age 36 year). [23] Mian MY, et al. [21] and Thahim K, et al, [20] found male preponderance with ratio of 3:1 and 7:3. However, this observation is in contradiction with some other studies in literature. Baloch ZA, et al.[19] observed that there were 26.3% male and 73.7% females in their study. Danyal R, et al.[24] and Krishnan S, et al.[25] also found female predilection.

A study was performed by Kordbacheh P, et al. on patients with nasal polyps to know the frequency of fungal sinusitis. This study included 100 patients who were examined by mycological and pathological methods for the presence of fungi. Fungal elements were shown in 9 % of all the samples by mycological methods. When compared to our study, the frequency of fungal infection was approximately 11% which is quite comparable to their study.[26]

Another study was performed by Telmesani LM, to know the frequency of fungal infection among patients with nasal polyps.[14] In this retrospective study the medical records of 91 patients with nasal polyps admitted for functional endoscopic sinus surgery were reviewed. The diagnosis of AFS was considered if histopathology showed the presence of eosinophilic mucin-containing fungal hyphae. Histopathological diagnosis was positive for AFS in 11 of 91 patients 12.1%. [14]The results of this study are also comparable to that of ours. This further testifies our results as the diagnostic criteria are similar in both studies i.e. on histopathology.

In another study by Baloch ZA, et al. 50 patients with nasal polyps were evaluated for AFRS. The mean age of patients was 27.3 ±12.98 years ranging from 9 to 64 years. All patients presented with history of nasal obstruction. Fungal infection was confirmed with histopathology in 38% patients. These studies showed a higher frequency of the disease. This is quite a higher number than any other study.[19] The above discussion reflects that frequency of fungal infection varies greatly among different authors from 9 % to 38%. In our clinical setup, the result is comparable to other studies.

## CONCLUSION

The frequency of allergic fungal sinusitis is high among patients with nasal polyps. So, it is recommended that every patient who present with nasal polyps, should be sort out for allergic fungal sinusitis. However, it is also required that every setup should have their surveillance in order to know the frequency of the problem.

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