

Original Research Article

Incidence of fungal etiology in patients with nasal polyps

N. Srivani^{1*}, Sudha Madhuri², K. Padma Malini³, O. Shravan Kumar⁴, Nagamani⁵

¹Associate Professor, Department of Pathology, Gandhi Medical College, Telangana State, India

²Assistant Professor, Department of Microbiology, Gandhi Medical College, Telangana State, India

³Assistant Professor, Department of Pathology, Gandhi Medical College, Telangana State, India

⁴Professor and HOD, Department of Pathology, Gandhi Medical College, Telangana State, India

⁵Professor and HOD, Department of Microbiology, Gandhi Medical College, Telangana State, India

*Corresponding author email: vanihariyamjala@yahoo.co.in

	International Archives of Integrated Medicine, Vol. 3, Issue 12, December, 2016. Copy right © 2016, IAIM, All Rights Reserved. Available online at http://iaimjournal.com/ ISSN: 2394-0026 (P) ISSN: 2394-0034 (O)	
	Received on: 30-09-2016 Source of support: Nil	Accepted on: 26-10-2016 Conflict of interest: None declared.
How to cite this article: N. Srivani, Sudha Madhuri, K. Padma Malini, O. Shravan Kumar, Nagamani. Incidence of fungal etiology in patients with nasal polyps. IAIM, 2016; 3(12): 19-25.		

Abstract

Introduction: Nasal polyposis is an inflammatory condition of varied etiology, of which fungal etiology is an important cause. Allergic fungal sinusitis (AFS) now is believed to be an allergic reaction to aerosolized environmental fungi in an immunocompetent host.

Aim and objectives: To determine the incidence of fungal etiology in the patients presenting with nasal polyps and correlate the histopathological findings with microbiological fungal cultures.

Materials and methods: This study has been carried out over a period of 2 years from July 2014 to June 2016 in the Department of Pathology, Gandhi Hospital. Histopathological sections of resected nasal polyps from 52 patients were studied for the presence of fungi and results correlated with fungal cultures done in Department of Microbiology.

Results: Majority of the polyps were unilateral 92% (48), seen in males 54% (28), most common in 3rd decade 27% (14). Histologically, 80% (40) of cases showed eosinophils and 23% of cases (12) showed presence of fungal hyphae. Fungal culture was positive in 34.6% (18 cases) with *Aspergillus* being the most common comprising 21% (11 cases). Others were *Candida pseudotropicalis* 1.9% (1 case), *Rhizopus* 5.7% (3 cases), *Mucor* 3.8% (2 cases), and *penicillium* 1.9% (1 case).

Conclusion: The incidence of fungal etiology in nasal polyps is significantly higher in our study compared to the west. Hence it is crucial to look for the presence of fungus in nasal polyps before administering treatment as use of antifungal therapy will benefit patients and prevent recurrence.

Key words

Nasal polyposis, Fungal culture, Eosinophils, Aspergillus.

Introduction

Nasal polyps are benign lesions arising from the nasal mucosa or nasal sinuses and are inflammatory in nature. The overall prevalence rate is probably about 2–4% [1-3].

Nasal endoscopic examination of a large number of patients with nasal polyposis [4, 5] have shown that nasal polyps are mainly situated in the middle meatus and originate from the nasal mucous membrane of the outlets (ostia, clefts, recesses) from the paranasal sinuses.

They usually arise in the upper part of the nose around the openings to the ethmoidal sinuses. They occur due to varied etiology and have a tendency to recur. Chronic inflammation causes oedema and reactive hyperplasia of the intranasal mucosal membrane, which forms a pedunculated mass in the form of polyp. The patients commonly present with rhinorrhoea, nasal block and restricted air flow due to presence of the mass.

Allergic and inflammatory polyps are most common. The importance of fungi as causative agent has gained lot of attention in the past few decades. It is important to know the exact etiology to administer proper treatment and to prevent the recurrence. In 1989, Robson et al introduced the term allergic fungal sinusitis following reports that this condition could be caused by a number of different fungi, not only *Aspergillus* [6].

Aim

The aim of this study was to determine the incidence of fungus as the etiological agent in nasal polyposis.

Materials and methods

The present study was conducted at the Department of Pathology, Gandhi Hospital

during the period from July 2014 to June 2016. Specimens of resected nasal polyps were collected from 52 patients and subjected to routine histopathological examination by H and E staining. Presence of eosinophils and fungal hyphae were noted in the histopathological sections of every polyp and special stains like PAS stain were done where necessary to determine a fungal etiology. The findings were correlated with 10% KOH mounts, Lactophenol Cotton Blue mounts and microbiological cultures done on sabouraud's dextrose agar. The results obtained were reviewed and analyzed (**Photo – 1 to 12**).

Photo – 1: H and E section of nasal polyp – 10X.

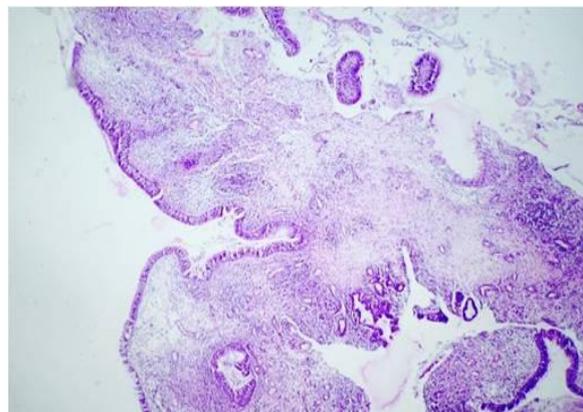


Photo – 2: H and E section showing inflammatory infiltrate composed predominantly eosinophils, plasma cells and neutrophils – 40X.

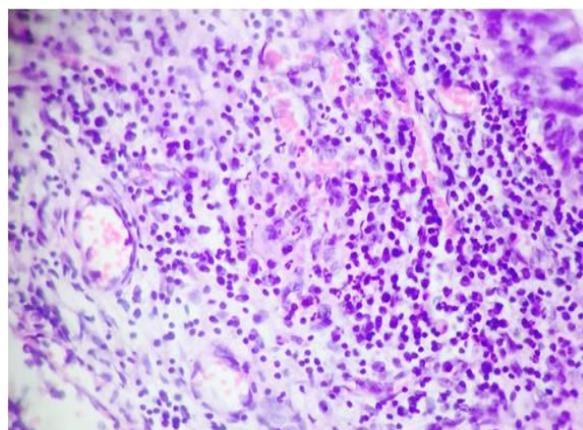


Photo – 3: H and E section showing inflammatory infiltrate composed predominantly eosinophils, plasma cells and neutrophils – 40X.

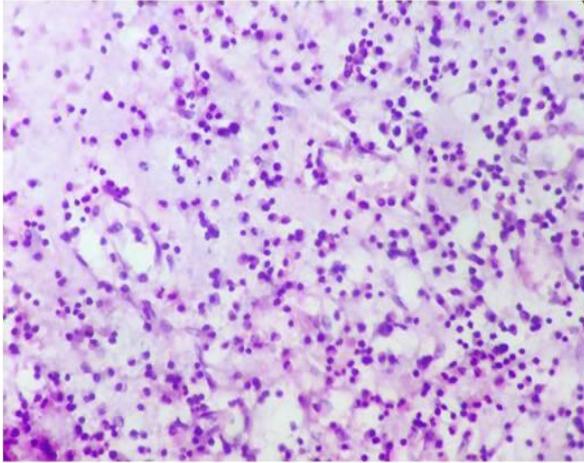


Photo – 6: PAS stained section showing fungal elements – 40X.

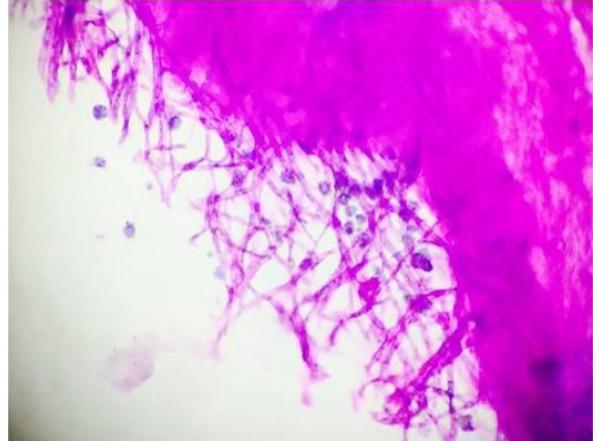


Photo – 4: H and E showing fungal elements – 40X.

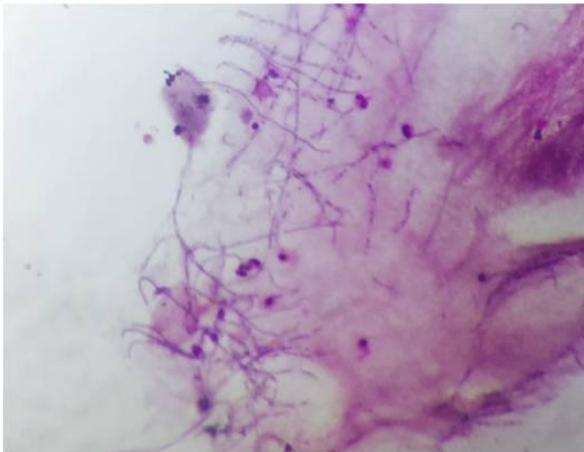


Photo – 7: PAS stained section showing magenta pink fungal hyphae – 40X.

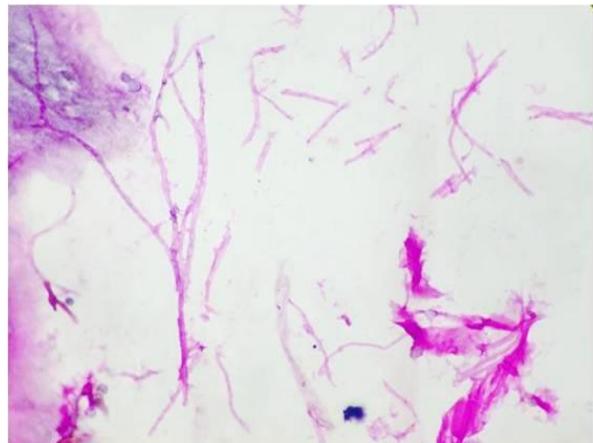


Photo – 5: H and E showing both fungal elements and eosinophils – 40X.

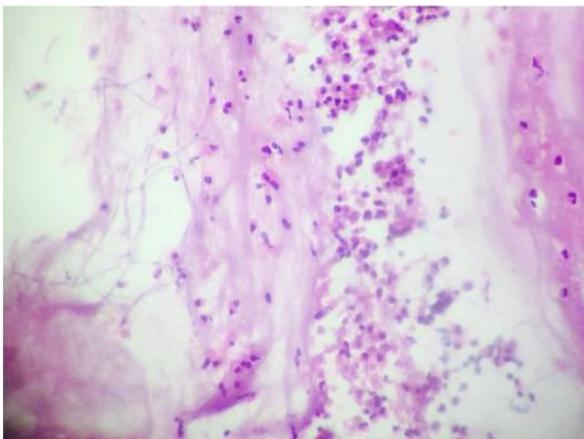


Photo – 8: Aspergillus niger on LPCB mount.

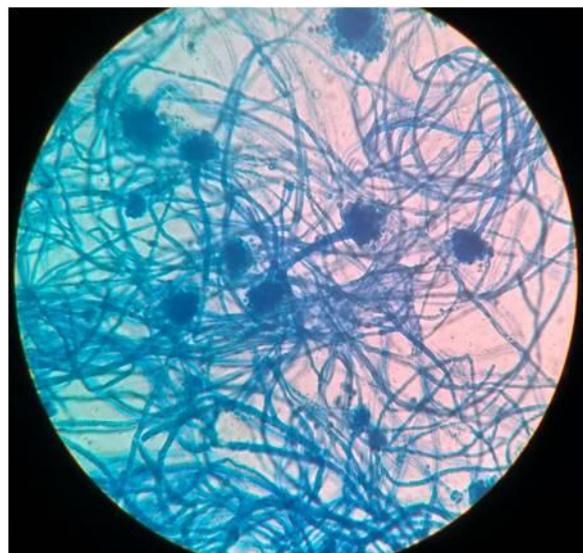


Photo – 9: Penicillium on LPCB mount.



Photo – 12: Aspergillus growth on SDA.

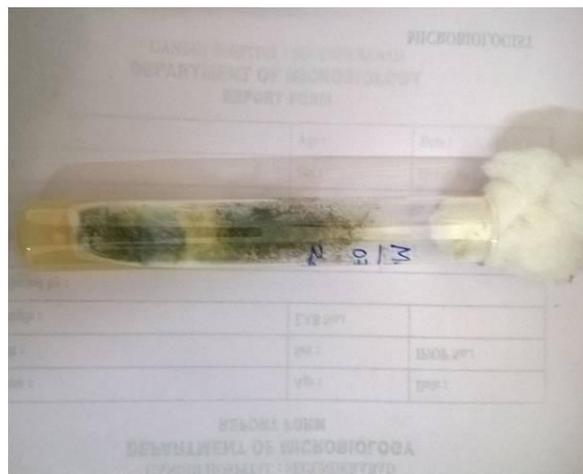


Photo – 10: Aspergillus flavus on LPCB mount.

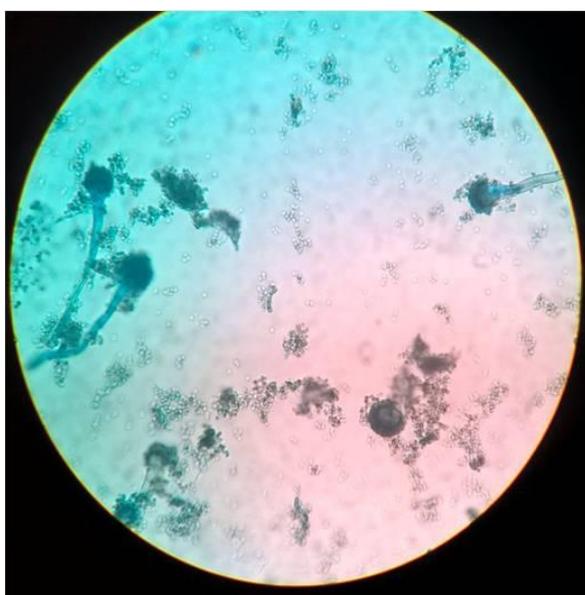
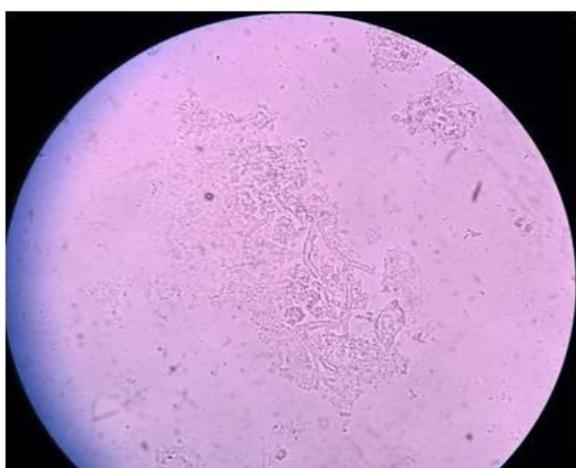


Photo – 11: Aspergillus hyphae in KOH preparation from nasal polyp.



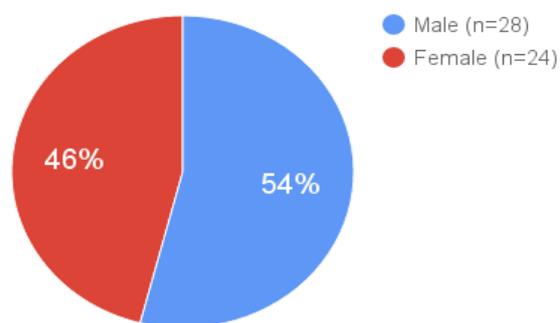
Results

A total of 52 patients in whom polypectomy was done in Gandhi Hospital during the study period were included in the study.

Out of the 52 cases, 54% (28) were male patients and 46% (24) were female patients (**Figure - 1**). The age of the study group ranged from 11 years to 72 years. Most number of cases 27% (14) belonged to 21 to 30 yrs age group (**Figure - 2**). The commonest presentation was unilateral nasal polyp in 92% (48) of patients.

Figure – 1: Sex distribution of cases.

Sex Distribution

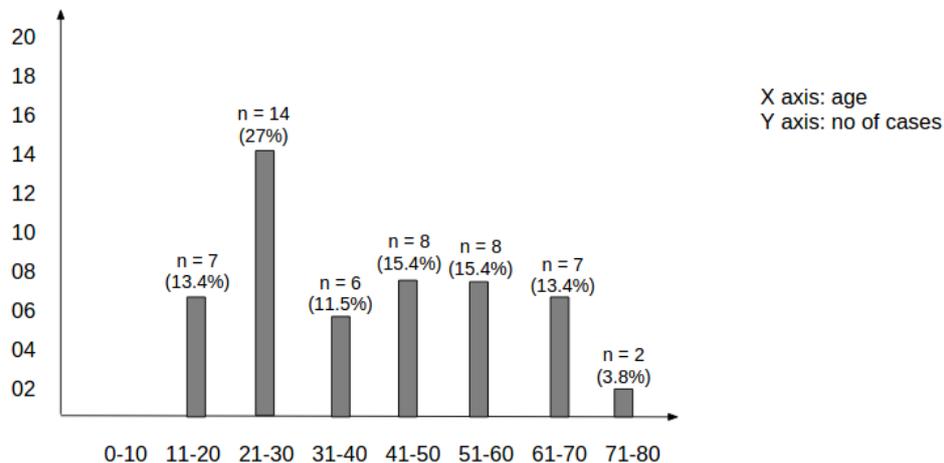


80% (41) of cases showed eosinophils on histopathology. 23% (12) of samples were positive for presence of fungal elements along with eosinophils on histopathology. 34.6% (18) of the samples were positive for presence of fungal elements on microbiological studies and culture.

Aspergillus was the most common species isolated on fungal cultures accounting for 11 out of 18 cases (61%). Others isolated were

Rhizopus 3 cases (16.6%), Mucor 2 cases (11.1%), candida pseudotropicalis (1) 5.5%, Penicillium 5.5% (1) as per **Figure – 3**.

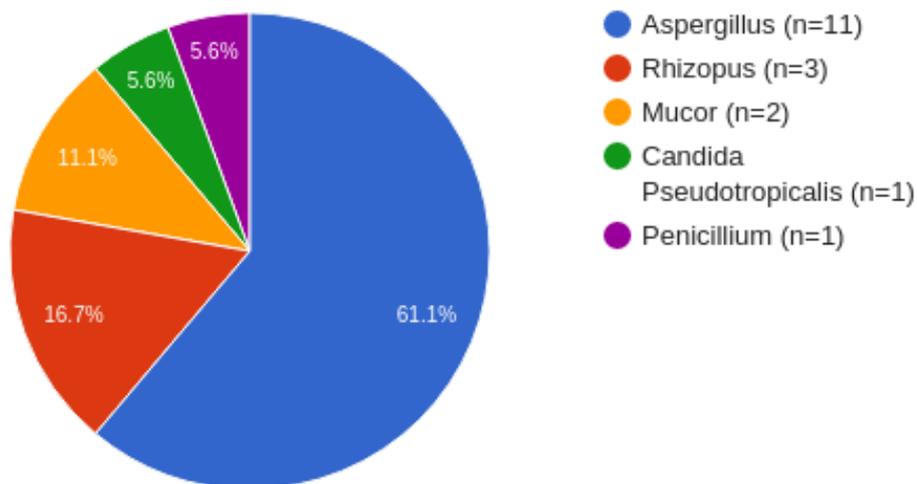
Figure – 2: Age wise distribution of cases.



GRAPH SHOWING AGE WISE DISTRIBUTION

Figure – 3: Distribution of various fungi on culture.

Distribution of various Fungi on Culture



Discussion

Nasal polyps are the most common tumors of the nasal cavity, the prevalence in general population being 1-4 percent [7, 8].

They result from chronic inflammation of mucosa of nasal cavity and sinuses due to a varied etiology which includes local and

environmental allergies [9], infections (bacterial, viral, fungal) and genetic syndromes (aspirin related or cystic fibrosis) [10].

Ethmoidal polyps are more common than antrochoanal. They are mostly seen in adults. In our study, incidence was slightly more in the males than the females. The clinical features included nasal obstruction, watery rhinorrhea,

post nasal drip, anosmia or hyposmia. The histopathological examination shows a polypoidal tissue lined by ciliated columnar epithelium, which can show squamous metaplasia sometimes. The basement membrane is thickened and underlying loose edematous stroma shows chronic inflammatory infiltrate composed predominantly of eosinophils (seen in almost 85% of cases) lymphocytes, plasma cells and neutrophils. Presence of fungal hyphae was noted in 23% of polyps in a study by Corey et al. Prevalence of fungal allergy is seen in 44% among patients with atopic rhinitis and the most prevalent fungi were *Alternaria*, *Helminthosporium*, and *Aspergillus* [11].

Local production of IgE by the nasal mucosa in the presence of eosinophilia is a response to fungal colonization [12].

Allergic Fungal Sinusitis is a new entity that has come up in the past two decades. It accounts for about 5-10% of all chronic rhinosinusitis patients who present with nasal polyps. It is believed to be a type 1 hypersensitivity reaction mediated by IgE. IgE levels are always increased in patients of AFS [13]. It occurs as a reaction to aerosolized environmental fungi in an immunocompetent patient. Deshazo criteria for AFS: (1997) [14].

- Radiographic evidence of sinusitis
- Allergic mucin (grossly or histopathologically)
- Positive fungal stain/ culture
- Absence of immunodeficiency/ diabetes
- Absence of fungal invasion

Ferguson stated that the simplest and most straight forward requirement for defining patients as having AFS is the presence of eosinophilic mucin with hyphae [15].

Geographically it is most common in temperate regions due to high humidity and most patients are adolescents with a mean age of 21.9 years. Various studies have shown a roughly equal sex distribution [16].

In our present study, *Aspergillus* species were the most common isolated fungi (17.3%) from the nasal polyps which is coinciding with the study of Ferguson, et al. [17] in contrast to the western studies where dematiaceous fungi are more common etiologic agents [18].

Conclusion

Fungal cultures in addition to Histopathology increase the detection of presence of fungi in nasal polyps. The incidence of fungal etiology is significantly higher in our study compared to west. Hence it is crucial to detect the presence of fungal elements in patients with nasal polyps before administering treatment in our country as use of antifungal therapy will benefit patients and prevent recurrence.

References

1. Settipane GA. Nasal polyps: pathology, immunology and treatment. *Am J Rhinol.*, 1987; 1: 119–26.
2. van der Baan B. Epidemiology and natural history. In: Mygind N, Lildholdt T, eds. *Nasal polyposis: an inflammatory disease and its treatment*. Copenhagen: Munksgaard, 1997: 13–6.
3. Hedman J, Kaprio J, Poussa T, et al. Prevalence of asthma, aspirin intolerance, nasal polyposis and chronic obstructive pulmonary disease in a population-based study. *Int J Epidemiol.*, 1999; 28: 717–22.
4. Stammberger H. *Functional endoscopic sinus surgery. The Messerklinger technique*. Toronto: BC Decker, 1991.
5. Stammberger H. Examination and endoscopy of the nose and paranasal sinuses. In: Mygind N, Lildholdt T, eds. *Nasal polyposis: an inflammatory disease and its treatment*. Copenhagen: Munksgaard, 1997: 120–36.
6. Robson JM, Hogan PG, Benn RA, et al. Allergic fungal sinusitis presenting as a paranasal sinus tumour. *Aust N Z J Med.*, 1989; 19(4): 351-3.

7. Hedman J, Kaprio J, Poussa T, et al. Prevalence of asthma, aspirin intolerance, nasal polyposis and chronic obstructive pulmonary disease in a population-based study. *Int J Epidemiol.*, 1999; 28: 717–22.
8. P Kordbacheh, et al. Fungi as causative agent of nasal polyps. *Iranian J Publ Health*, 2006; 35(1): 53-57.
9. Bateman ND, Fahy C, Wollford TJ. Nasal polyps: still more questions than answers. *J Laryngol Otol.*, 2003; 117(1): 1-9.
10. Norlander T, Bronnegard M, Stierna P. The relationship of nasal polyps, infection and inflammation. *Am J Rhinol.*, 1999; 13(5): 349-55.
11. Corey J, Kaiseruddin S, Gungor A. Prevalence of mold-specific immunoglobulins in a Midwestern allergy practice. *Otolaryngol Head Neck Surg.*, 1997; 117: 516-20.
12. Bachert C, Gevaert P, Holtappels G, Johansson SGO, Van Cauwenberge P. Total and specific IgE in nasal polyps is related to local eosinophilic inflammation. *J Allergy Clin Immunol.*, 2001; 107(4): 607-14.
13. Corey JP. Fungal diseases of the sinuses. *Otolaryngol Head Neck Surg.*, 1990; 103: 1012-1015.
14. Deshpande RB, Shukla A, Kirtane MV. Allergic fungal sinusitis: incidence and clinical and pathological features of seven cases. *J Assoc Physicians India*, 1995; 43(2): 98-100.
15. Ferguson BJ. The diagnosis of allergic fungal sinusitis. In: *Leviene HL*, editor. In sinus surgery, endoscopic and microscopic approaches. Thieme Medical., 2005, p. 290–299.
16. McClay JE, Marple B, Kapadia L, et al. Clinical presentation of allergic fungal sinusitis in children. *Laryngoscope*, 2002; 112(3): 565-9.
17. Ferguson, et al. The diagnosis of AFS. *Thieme Medical*; 2005, p. 290-299.
18. Ferguson BJ, et al. Geographical variation in allergic fungal rhinosinusitis. *Otolaryngol Clin North Am.*, 2000; 33: 441–449.