

Nose and Paranasal Sinuses: Profile of Fungal Infections.

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ABSTRACT

Background: Fungal infections of the nose and paranasal sinuses present with a spectrum of clinical manifestations which is mainly determined by the complex interplay of the pathogenicity of the fungus and the host immune system. In India, most of the fungal infections of the nose and paranasal infections are reported from the southern states although high incidences of paranasal sinusitis are also reported from other states of the country. Data regarding the above from the north-eastern part of the country is hardly available. Hence, it was felt important to make an effort to recognize and detect the presence of fungal infection in this part of the country. **Aims & objectives:** The present study was conducted to find out the incidence of fungal infections of the nose and PNS among all patients having allergic or infective disorders, to study the various risk factors associated with it, to study the clinical profile of the patients and also to assess the prognosis after treatment. **Methods:** A prospective study was taken up during the period Feb 2003-Oct 2004 in the Otorhinolaryngology Department of the Regional Institute of Medical Sciences (RIMS), Imphal, Manipur. All the patients attending the OPD and IPD of the department because of chronic allergic and infective disorders were the study subjects. Detailed information on socio-demography and clinical history were collected by using a semi-open interview schedule. Next, a thorough physical examination and examination of the ear, nose and throat were done. Appropriate routine investigations and a thorough fungal study were performed using representative specimens in collaboration with the Department of Microbiology of the same institute. **Results:** The fungal infection rate was found to be 4.61% (M=4.84% and F=4.21%). This rate went up as high as 17.85% among immuno-compromised patients. The main fungal species identified were *Candida* (53%) and *A. niger* (27%). *Mucor* and *Fusarium* species were also found. Among the immuno-compromised patients *Candida* was the commonest species found (93%) whereas among the immune-competent patients *A. niger* was predominantly found (47%). Nasal obstruction, congested nasal mucosa, epistaxis, nasal discharge and maxillary sinus tenderness were the common clinical findings. Depending on the case-wise merits three-fifths of the cases were given surgical treatment whereas the remaining two-fifths were treated conservatively with medications only. All the cases were either cured or showed improvement. **Conclusion:** Fungal infection of the nose and PNS in this part of the country was found in 4.61% of patients with chronic allergic and/or infective disorders of the nose and PNS. The common fungi infecting were *Candida*, *A. niger*, *Mucor* and *Fusarium*. The fungal infection rate was almost six-times increased in immune-compromised patients compared to normal patients. *A. niger* was predominantly associated with immune-compromised status.

Keywords: *Aspergillus niger*, *Candida*, Fungal infection, *Fusarium*, *Mucor*, Nose and PNS.

INTRODUCTION

Fungal infections of the nose and paranasal sinuses (PNS) present with a spectrum of clinical manifestations which is mainly determined by the complex interplay of the pathogenicity of the fungus and the host immune system.^[1] In India, most of the fungal infections of the nose and paranasal infections are reported from the southern states although high incidences of paranasal sinusitis are also reported from other states of the country.

Sinusitis is a common disorder, affecting one-fifth of the population at some time of their lives.^[2] Whether fungi can exist in the sinus mucus without causing

disease is yet unclear. The incidence of fungal sinusitis seems to be increasing over the past three decades. Yet until recently no clear classification existed and most cases were grouped under the general term of "Aspergillous sinusitis". With the introduction of new diagnostic tools, the diagnosis of fungal infections in the nose and paranasal cavities are on the rise and the term "Fungal rhinosinusitis" is in vogue. There are two broad types of fungal diseases: invasive and non-invasive.^[1,3] The clinical syndromes may overlap in the same patient and may progress from non-invasive to invasive form, if the host immune status changes. Resultantly, the prognosis is very much dependent on the type of the infecting fungus and the immunological status of the host.^[1]

Data regarding the above from the north-eastern part of the country is hardly available. Hence, it was felt important to make an effort to recognize and detect the presence of fungal infection in the nose and the PNS among patients attending a teaching medical

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institute in Manipur. The study might help in formulating an appropriate and prompt approach to the treatment of the condition thereby reducing the morbidity and mortality.

Aims & objectives

The present study was done to find out the incidence of fungal infections of the nose and PNS among all patients having allergic or infective disorders, to study the various risk factors associated with it, to study the clinical profile of the patients and also to assess the prognosis after treatment.

MATERIALS AND METHODS

A prospective study was taken up during the period Feb 2003-Oct 2004 in the Otorhinolaryngology Department of the Regional Institute of Medical Sciences (RIMS), Imphal, Manipur. All the patients attending the OPD and IPD of the department because of chronic allergic and infective disorders were the study subjects. Detailed information on socio-demography and clinical history were collected by using a semi-open interview schedule. Next, a thorough physical examination and examination of the ear, nose and throat were done. Appropriate routine investigations and fungal study (fungal culture, histopathological examination and microscopic examination of scraping and mucosal discharge) were performed using representative specimens in collaboration with the Department of Microbiology of the same institute.

The patients were then followed up until discharge from the department.

Data collected were analyzed by using descriptive statistics.

RESULTS

650 eligible subjects (413; 63.5% males and 237; 36.5% females) participated in the study. Their ages ranged from 11 years to 70 years, 482 (74%) being from the economically productive age-group of 21-50 years. Of these 650 patients, 566 (86.07%) were immune-competent patients while the remaining 84 (12.92%) were immune-compromised patients (AIDS, Diabetes mellitus, Cancer, Prolonged antibiotic or corticosteroid treatment), the rate of immune-compromised status being much higher among males compared to females (63% versus 37%).

A total of 30 patients were found to have fungal infections of the nose and/or PNS, giving a fungal infection rate of 4.61%. This rate was slightly higher among males (4.84%) compared to females (4.21%). Among the immune-compromised group, this rate was much increased (17.85%) whereas among the immune-competent groups it was only 2.65% [Table 1].

Table 1: Fungal infection patients by sex & immune status (n=30).

Immune status	No. of male pts.	No. of females pts.	Total (%)
Immuno-competent (n=566)	9 (360*)	6 (206*)	15 (2.65)
Immuno-compromised (n=84)	9 (53*)	6 (31*)	15 (17.85)
Total (n=650)	18 (4.84%)	12 (4.21%)	30 (4.61%)

* Number of eligible study subjects

When analyzed for the fungal species, *Candida* comprised more than half of the cases (16; 53%), three-fourths of them found in males. This was followed by *Aspergillus niger* (8; 27%) which was equally distributed among the two sexes. *Mucor* and *Fusarium* were the other fungal infections detected [Figure 1].

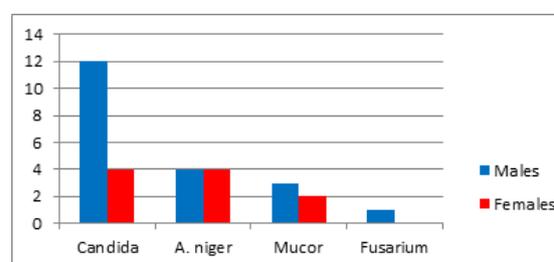


Figure 1: Distribution of fungal species by sex (n=30)

Among the 15 immuno-compromised patients having fungal infections of the nose and/or PNS *Candida* was the most commonly detected species (14; 93%) whereas *A. niger* was found only in one patient (7%). And among the 15 immuno-competent patients having fungal infection *A. niger* was the most frequently found species (7; 47%) followed by *Mucor* (5; 33%), *Candida* (2; 13%) and *Fusarium* (1; 7%) [Figure 2].

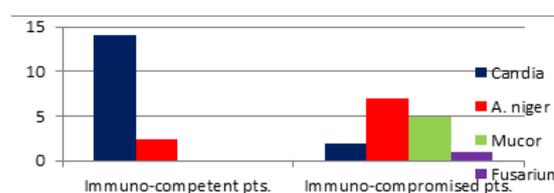


Figure 2: Fungal species by host immune status

By symptomatology, nasal obstruction was the most common symptom among the 30 patients having fungal infection (25; 83%). Bleeding from nose (47%), headache (43%), itching of nose, sneezing, nasal discharge (37%) each were the other common symptoms. Pain around nose also was complained of by a few. [Figure 3] given below illustrates the main

clinical findings of these patients among the two sexes. Nasal obstruction, congested nasal mucosa, epistaxis, nasal discharge and maxillary sinus tenderness were the common clinical findings.

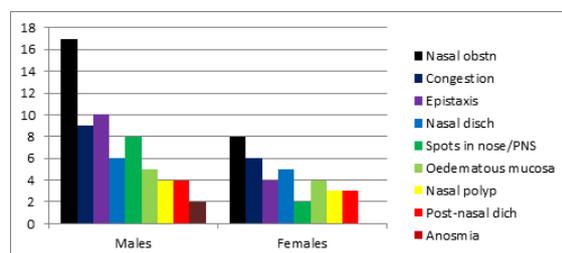


Figure 3: Clinical findings in fungal infection pts.

Depending on the case-wise merits three-fifths of the cases were given surgical treatment whereas the remaining two-fifths were treated conservatively with medications only. All the cases were either cured or showed improvement.

DISCUSSION

The prevalence rate 4.61% for fungal infections in the nose and PNS as found out from the current study is comparable to the figure of 4.5% reported by Zawiska EK in 1975 showing that nothing has changed much in the scenario in the last three decades.^[4]

As expected the rate of fungal infection was found to be much higher among the immune-compromised patients (17.85%) compared to that of the immune-competent patients (2.65%). Hence, it can be concluded that immune-compromised status is an inevitable risk factor for contracting fungal infection of the nose and PNS.

Candia and *A. niger* were the two fungal species found to infect the nose and PNS in the immunocompromised hosts. In other studies from other parts of the world, 90% of fungal rhinosinusitis was reported to be caused by *A. fumigatus*.^[5] In the immune-competent patients also *Aspergillus* is reported to be the commonest species that infects the nose and PNS.^[6] The difference in the study-setting might be reason for this discrepancy.

The commonest symptom with which patients sought treatment was nasal obstruction followed by nasal bleeding. In addition to these, the symptomatology was found to be of a varied nature. And the common clinical findings were nasal obstruction, congested nasal mucosa, epistaxis, nasal discharge which may be stained or watery, tenderness over the maxillary sinus etc. The presence of pale and bluish nasal mucosa was suggestive of allergic rhinitis and the presence of white or black spots and green or brown sludge were indicative of fungal infection.

Surgical treatments in the form of antral washing, Caldwell-Luc operation, polypectomy, comprehensive endoscopic sinus surgery and functional endoscopic sinus surgery and conservative treatment with appropriate antibiotics, antifungals, anti-histaminics, local corticosteroid sprays and systemic corticosteroids were found to be rewarding.

CONCLUSION

Fungal infection of the nose and PNS in this part of the country was found in 4.61% of patients with chronic allergic and/or infective disorders of the nose and PNS. The common fungi species infecting the nose and PNS. The common fungi species infecting the nose and PNS were *Candida*, *A. niger*, *Mucor* and *Fusarium*. The fungal infection rate was almost six-times increased in immune-compromised patients compared to normal patients. *A. niger* was predominantly associated with immune-compromised status. Surgical and medical treatments were equally important in the management of fungal infections in nose and PNS.

REFERENCES

1. Kameswaran M. Allergic fungal rhinosinusitis, ENT, What's new. Basker DM, Mumbai, 1st Edn, 2002, pp5-11.
2. Nechama URI, Elmalah I, Domeck I, Greenberg E. Classification of fungal sinusitis in immune-competent patients. *Head Neck Surg* 2003;129:353-7.
3. Rowe-Jones J. Paranasal aspergillosis – a spectrum of diseases. *J Laryngol Otol* 1993;107:773-4.
4. Zawiska EK. The role of fungi in the aetiology of allergic reactions of the upper respiratory tract. *Otolaryng* 1975;29:49-53.
5. Weir N, Wood GDG. Infective rhinitis and sinusitis, in Scott-Brown's Otolaryngology, Mackay IS and Bull TR: Butter worth Heinemann, Oxford, 6th Edn. 4,4/8/39 -4/8/44, 1997.
6. Stammberger H, Jaske R, Beaufort F. Aspergillosis of the paranasal sinuses, histopathology and clinical aspects. *Ann Otol Rhinol Laryngol* 1984;93:251-6.

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