



ORIGINAL RESEARCH PAPER

Medicine

MYCOLOGICAL STUDY OF THE NOSE & PARANASAL SINUSES IN 100 CASES

KEY WORDS:

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ABSTRACT

Fungal infections of nose & paranasal sinuses are caused by opportunistic fungi. Fungi constitute a large diverse group of heterophilic organisms, most of which are found as saprophytes in the soil and on decaying plant material. Some yeast are commensals of man and cause endogenous infections when there is some imbalance in the host. The present study was conducted on 100 clinically suspected cases of chronic sinusitis which were taken from the Department of Microbiology, Ayaan Institute of Medical Sciences during the period of one year. Samples consisted of two swabs of nasal discharge/antral lavage. One of the sample was inoculated on SDA medium while from other swab direct microscopic examination both wet preparation using 10% KOH & gram's staining was done. 33 (33%) cases were culture positive, 20 (20%) cases were KOH positive while 8 cases were Gram's staining positive. Out of 33 culture positive cases the common isolates were *A. flavus* 20 (60%) cases followed by *C. albicans* 8 (24%) cases & *A. fumigatus* 2 (6.25%) cases. *Mucor*, *Rhizopus* & *Penicillium* was isolated from one case each (3.25%). Conclusion: Treatment modalities consist of early diagnosis, surgical debridement followed by antifungal drugs.

INTRODUCTION

Fungal sinusitis is reported with increased frequency which has been attributed to greater clinical awareness of existence of mycotic infections. The nose with its moist environment & with sequestered spaces provide an ideal environment for growth of fungus. First paranasal mycosis was reported by Mackenzie in 1893. Since then numerous cases have been reported from world wide with increased incidence from Sudan area. Now it is not uncommon in India too. Some common opportunistic fungi which cause paranasal fungal infections are *Candida albicans*, *Aspergillus flavus*, *Rhizopus*, *Mucor*, & *Cryptococcus neoformans*.

The incidence of sinus infection by various fungi is being reported with increased frequency. The fungi are widely found in the environment and most of them are harmless commensals. The people working with decaying vegetation, like moldy hay in agriculture are maximally exposed. The frequency & relative importance of these infections is on rise in developed countries, which is possibly related to increased number of immunocompromised patients. The various causes attributed to the causation of mycotic infection are as follows:-

- More aggressive treatment modalities for cancer patients.
- Increased number of immunocompromised patients.
- Increased number of AIDS patients.
- More aggressive intensive care medicine in adults.
- New and more widely used prosthetic devices.
- Wide spread use of broad spectrum antibiotics.
- Increased number of i/v drug users.

The present was conducted to study 100 cases of chronic sinusitis mycologically & clinically. To identify the various fungi by direct microscopy & gram's staining. To isolate & confirm various causative fungi by culture on SDA medium & by performing different specific tests.

MATERIAL AND METHODS

One hundred cases of chronic sinusitis were studied for fungal infection in Department of Microbiology, Ayaan Institute of Medical Sciences, Teaching Hospital & Research Centre, Hyderabad.

Sample collection:

Two nasal swabs were collected.

PROCESSING OF SPECIMEN:

Direct Examination:

(I) WET PREPARATION:

10% KOH was mixed with the specimen on a glass slide & specimen material was teased with two inoculating needles. A cover slip was placed on it & examined 1" under low power than under high power of the microscope to ascertain the presence of hyphae (separate or non separate), yeast cells, spores & pseudohyphae.

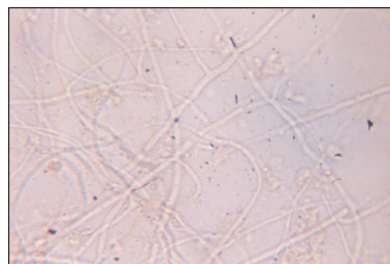


Figure 1: Septate hyphae of Aspergillus species in a wet mount preparation in 10% KOH

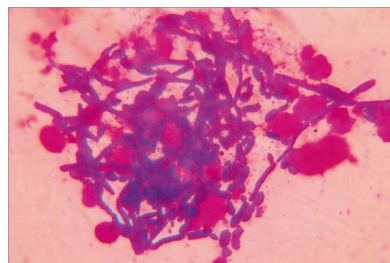


Figure 2: Gram stain of Candida species showing yeast cells and pseudohyphae

(II) GRAM'S STAINING:

Smear was prepared, fixed & stained by Gram staining method. It stains the fungi as gram positive.

CULTURE:

Culture was done on Sabouraud's Dextrose Agar Medium with antibiotics i.e 0.05mg/ml chloramphenicol & 0.02 mg/ml gentamycin which were added to inhibit the growth of bacteria. The culture tubes were kept at 22°C in BOD incubator for 4 weeks and were examined daily for a week and twice a week for 4 weeks.

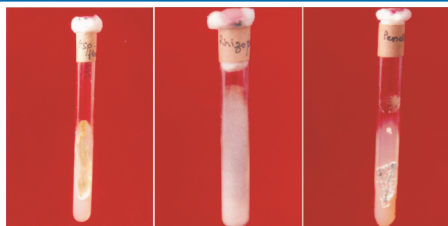


Figure 3: Culture tube showing growth of Aspergillus flavus, Rhizopus and Penicillium species.

Identification of the Fungi was done by LCB Mount

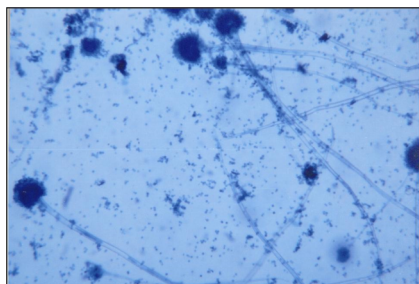


Figure 4: LCB mount showing Aspergillus flavus 200X

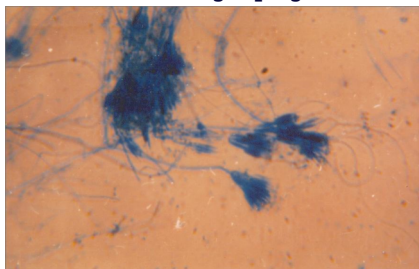


Figure 5: LCB mount showing Penicillium 200X

OBSERVATIONS AND RESULTS

In the present study maximum number of patients were in the age group of 21- 30 years & minimum in the age group of 0-10 years & 71-80 years. there were 68 males & 32 females. 58 patients were from rural background & 42 patients were from urban back ground. Maximum number of patients 44 (44%) had duration of illness ranging between 2-5 years.

Out of 100 patients of chronic sinusitis, 29 (29%) patients had some predisposing factors like Diabetes mellitus (11 cases), drug addiction (10 cases), tuberculosis (4 cases) & 4 cases were on steroid therapy. 58% had the involvement of maxillary sinus, 32% had the involvement of maxillary sinus & ethmoid sinus while 10% had involvement of ethmoid sinus only.

20% cases were KOH positive while 80% cases were KOH negative. [Table 1] Out of 100 cases, only 10 (10%) cases were positive by Grams staining & 90 (90%) cases were Grams staining negative. [Table 2] Culture was positive in 33 (33%) cases, while 67 (67%) cases were culture negative.

Out of 33 culture positive cases the commonest isolates was A.flavus from 20 (60%) cases followed by Candida albicans from 8 (24%) cases, A.fumigatus from 2 (6.25%) cases, Mucor, Rhizopus & Penicillium was isolated from one case each (3.25%).

Table 1: Direct microscopy (KOH mount)

| KOH positive (%) | KOH negative (%) | Total no of cases |
|------------------|------------------|-------------------|
| 20 (20%) | 80(80%) | 100 |

Table 2: Direct microscopy (Gram's staining)

| Gram's staining positive (%) | Grams staining negative (%) | Total no of cases |
|------------------------------|-----------------------------|-------------------|
| 10(10%) | 90(90%) | 100 |

Table 3: VARIOUS ISOLATES OBTAINED ON SDA MEDIUM

| Fungal Species isolated from culture | Number of cases |
|--------------------------------------|-----------------|
| A.flavus | 20 |
| Candida albicans | 8 |
| A.fumigatus | 2 |
| Rhizopus | 1 |
| Mucor | 1 |
| Penicillium | 1 |
| Total | 33 |

DISCUSSION

Although mycological infections of nose & paranasal sinuses has been established as a distinct clinical entity, the true incidence of fungal infections among patients with chronic allergic rhinosinusitis remains unknown. Various studies showed the difference in prevalence of fungal sinusitis positivity which may be due to the type of study group. However, the results of present study are comparable to Berry et al (2002), Ravikumar et al (2004) & Gill et al (2004).

Berry et al (2002) reported a total of 402 patients. Aspergilloma was found in 136 patients (33.8%). Commonest isolate was Aspergillus species i.e 33.8%.

Gill et al (2004) who reported 200 cases of chronic sinusitis, out of which 83 (41%) were culture positive. Out of 83 cases, 22 (26.5%) were KOH positive, Grams staining positive & culture positive. 61(73.5%) were culture positive only. A.flavus was isolated in 47 (56.6%) cases, Candida in 22 (26.5%), A.terrus in 8 (9.5%) cases, Penicillium from 4 cases (4.5%), Mucor in 1 (1.5%) case. Combined growth of A.flavus & A.terrus in 1 (1.5%) cases.

Ravikumar et al (2004) reported 30% samples which were KOH positive & 40% samles culture positive. A.flavus was the commonest isolate 40% cases.

From our study & the study of other authors, one obvious finding is that A.flavus is the commonest species of fungus seen.

SUMMARY AND CONCLUSION

Out of 100 cases, 33 cases were culture positive, most common isolate was A. flavus followed by C.albicans, A. fumigatus, Rhizopus, Mucor, Penicillium. Fungal infections were associated with Diabetes mellitus, malignancy, patients on prolonged steroid and antibiotic therapy. The disease was found more commonly in farmers and labourers. Treatment modalities consist of early diagnosis, surgical debridement followed by antifungal drugs. Excessive use of steroids, unnecessary use of broad spectrum antibiotics and other immuno-suppressive drugs should be used judiciously. The timely diagnosis both clinically and mycologically and prompt treatment can save the patient.

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