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Original Article

Fungal Maxillary sinusitis: A prospective study in a tertiary care hospital of eastern Nepal

Joshi RR[1], Bhandary S[2], Khanal B[3], Singh RK[4]
[1]Senior Resident, [2]Associate Professor, [4]Assistant Professor, Department of Otolaryngology Head and Neck Surgery
[3]Additional Professor, Department of Microbiology, B P Koirala Institute of Health Sciences, Dharan, Nepal

Abstract

Introduction: The incidence of mycotic infections and the diversity of pathogenic fungi have increased dramatically in recent years. Fungal sinusitis should be considered in all the patients with chronic maxillary sinusitis (CMS), especially in association with certain clinical features that serve as clue to the diagnosis. *Aspergillus* is the most common fungal pathogen in maxillary sinus.

Methodology: A total of 100 patients those who fulfilled the diagnostic criteria (Lanza and Kennedy[3], 1992) for chronic rhinosinusitis were eligible for this open level and randomized prospective study. Only those above 14 years of age were included.

Results: Fungal maxillary sinusitis was seen in 14% of all cases of chronic maxillary sinusitis in eastern part of Nepal. We identified *Acremonium* and *Candida* species as commonest fungi involved in fungal maxillary sinusitis (FMS). To the best of our knowledge this is the first such study conducted in eastern Nepal.

Key words: Fungus, Sinusitis, Maxillary

Plaignaud[1] first reported fungal sinusitis in 1791 AD. Since then it has been bring into being the foremost challenges for clinicians, clinical microbiologists and basic scientists. Fungal diseases of the nose and paranasal sinuses are not common. The fungal agents isolated from paranasal sinuses include *Aspergillus, Mucor, Histoplasma, Coccidiodies,* and *Candida*. *Aspergillus* is the most common fungal pathogen causes fungal sinusitis.[1]

It is prudent to identify the causative fungal agent responsible for sinus disease in favour of effective treatment. The pattern of organism varies from place to place and depends upon age, habitual of the inhabitants, their immune status and the clinical factor.[2] This is the first such study done in eastern Nepal with the purpose to determine the quantum and type of fungal infection in CMS. The demographic pattern has also been discussed.

Materials and methods

A total of 100 patients those who fulfilled the diagnostic criteria (Lanza and Kennedy[3], 1992) for chronic rhinosinusitis were eligible for this open level and randomized prospective study. Only those above 14 years of age were included. After obtaining the complete history, physical examination and relevant investigations were carried out for each patient. After confirming the diagnosis of CMS, antral puncture lavage was performed. With the help of a 20 ml syringe through canula, about 15 to 20 ml normal saline was pushed into the antrum and then aspirated through the same canula. Aspirate was immediately transported to the microbiology laboratory. In the laboratory each specimen was subjected to microscopic examination and fungal culture as per standard mycological methods.

A small amount of specimen was mixed with 10% Potassium Hydroxide (KOH) and was examined under magnification of 40 objective for the presence of fungal elements. The size, morphology and quantity of any fungal elements were noted. Specimen was inoculated on to Sabouraud's Dextrose Agar (SDA) with antibiotics for fungal culture. SDA was inoculated at 28^0C and observed for fungal growth daily for one week and every week for three weeks. Growth, if any, was identified on the basis of rate of growth, colour, texture, pigmentation of fungal colony and their morphological features in microscopy.

Results

Out of 100 diagnosed cases of chronic maxillary sinusitis, FMS was found in 14 subjects. Among these most were at 2nd and 3rd decades of life (Table 1). No sex predilection was observed. Eight subjects (57.1%) were from urban areas, while six (42.9%) were from rural areas.

Correspondence
Dr. Rupesh Raj Joshi,
Senior Resident, Department of Otolaryngology Head and Neck Surgery,
B.P. Koirala Institute of Health Science, Dharan, Nepal
E-mail: sans212@yahoo.com

Eight (57.1%) patients belonged to Mongoloid race from hilly areas of the country while nine (42.9%) were Indo-Aryans from plains. Out of 14 cases of FMS, 4 patients gave the past history of antibiotics and analgesics use. Three patients had used the steroids spray, while in 7 patients there was no history of any medications in the past. Two patients were found to have diabetic mellitus and one each had asthma and gastritis. The nasal discharge was the chief presenting symptom in 11 cases, followed by headache in 7 (50%) while, 6 subjects (42.9%) complained of nasal blockage, either bilaterally or unilaterally. Seven cases presented with halitosis. Hyposmia or anosmia was present in 6 cases. Both facial pain or pressure and dental pain were present in 4 cases. These were 3 cases who present with facial congestion and/ or fullness. Earache, cough and fatigability were present in 2 cases. A single patient (7.1%) complained of foreign body in the throat. X-ray of paranasal sinus occipitomental view (Water's view) was taken. The bilateral maxillary antri were found hazy in 9 cases. Unilateral haziness of the left and right side was found in 2 and 3 cases respectively. None of the radiographs was normal in the fungal sinusitis cases. Fungal elements were detected in 14 (14%) of the total cases studied. Culture positivity could be correlated with positive direct microscopy in 6 of the total cases. Eight of the total cases yielding the fungal growth on culture, but negative KOH preparation (Table 2). The study revealed that *Acremonium* and *Candida* species are common organisms causing fungal sinusitis followed by *Aspergillus, Culvularia, Fonsecaea* and *Penicillum* species (Table 3). There were four patients of diabetes mellitus. Out of these four, fungi were isolated in two cases. The organisms isolated in diabetics were *Aspergillus* and *Candida* species.

Table 1: Age distribution of the patients of fungal sinusitis

Age range (years)	**Patients with fungal sinusitis n=14 (100%)**
15-24	4 (28.6%)
25-34	3 (21.5%)
35-44	2 (14.2%)
45-54	3 (21.5%)
>55	2 (14.2%)

Table 2: Correlation of KOH preparation and culture

Methods	**Frequency n=14 (100%)**
Only KOH preparation positive	0 (0%)
Both KOH preparation and culture positive	6 (42.9%)
KOH preparation negative but culture positive	8 (57.2%)

Table 3: Fungi isolated

Fungus species	**Frequency n=14 (100%)**
Acremonium	4 (28.6%)
Candida	4 (28.6%)
Aspergillus	3 (21.5%)
Curvularia	1 (7.1%)
Fonsecaea	1 (7.1%)
Penicillum	1 (7.1%)

Discussion

The incidence of mycotic infections and the diversity of pathogenic fungi have increased dramatically in recent years. Deshazo et al[4] reviewed the cases of fungal sinusitis and stated that the FMS should be considered in all the patients with chronic rhinosinusitis, especially in association with certain clinical features that serve as clue to the diagnosis. Out of 100 diagnosed cases of CMS in our series, fungi were isolated in 14 cases (14%). Aher et al[5] studied 50 cases of CMS, out of which 3 isolates were the fungi. Similarly, Evans et al[6] isolated fungus in one case when he studied 24 such subjects. On the other hand Grewal et al[7] reported fungi in 10.7% patients suffering from CMS. Our finding is as nearer to the observation of Grewal et al. In the present study, the age of patients varied from 15 years to 71 years. The median age was 30 years. The age group 15 to 24 years was found to be more commonly affected by the FMS. Our result is in accordance with the results of Manning SC et al[8] and Schubert MS et al[8]. Lebowit et al[10] reported that out of 25 diagnosed cases of FMS in their study, 13 (56.5%) were females. However, Manning SC et al[8] noted a male predominance with 1.6 males per females. Our result is identical to the result of Lebowit et al.

Present study showed that out of total number of the patients of fungal sinusitis cases, 8 were from the urban areas and 6 from the rural areas. This could be due to the fact that the population residing in the urban area is more commonly exposed to the irritant pollutants of traffic, dust, factories residuals in compare to the population in the rural region; these irritants causes rhinitis and lead to the CMS. The disease is more common in warmer and humid climate.[11] Among the 14 cases of the FMS, 8 were Aryans and 6 were Mongoloids. The slightly high incidence of fungal sinusitis among the Aryans could not be explained. Further study is needed to explain this observation. Among the FMS cases, two patients had diabetes mellitus and one each had of asthma and gastritis. Out of 14 cases of FMS, 4 patients gave the past history of using combinations of antibiotics and analgesics. Three patients had used the steroids sprays in past and in 7 patients there was no history of any medications in the past. Ahmed-Al-Bhlal L[12] studied 26 cases of FMS. The clinical presentation of the most of the patients was nasal obstruction of corresponding side with or without headache and nasal discharge. After doing study on 24 patients Rupa et al[13] revealed nasal obstruction in 23 cases (96%).

McClay et al[14] studied 14 such subjects in which 7 cases presented with headache, 6 with nasal blockage, and single subject with the foreign body sensation in the throat. Reason for difference in clinical presentation between the studies conducted in the other places and our study is probably that more advanced cases of CMS with the polypoidal changes were included in other studies whereas early cases without any polypoidal features were considered in our study. There were 6 cases that were positive on both KOH preparation and culture, in 8 cases fungi were isolated in culture but fungal elements were not seen in KOH preparation. KOH gradually dissolves the human material and makes the fungal cell easier to see. It was used in this study because potassium hydroxide is used traditionally and is also cheap. But even for the experienced person, the sensitivity of this method is relatively low; this may be the cause for the negative KOH method but positive culture cases.[2,5,13] In most of the series the *Aspergillus* species have been found as commonest fungus causing FMS. Apart from that the other isolate would be *Candida* species, *Curvularia* species, *Dreschlera* species, and *Bipolaris* species.[2,5,10,13,14] We isolated *Acremonium* and *Candida* species as common fungi in our subjects. The other isolates were *Aspergillus* in 3 cases and one each of *Curvularia, Fonsecaea* and *Penicillium* species. This study reveals that the *Acremonium* and *Candida* species were common organisms causing FMS in this part of the country.

Conclusion

Fungal maxillary sinusitis was seen in 14% of all cases of chronic maxillary sinusitis in eastern part of Nepal. Although, the FMS was most common in younger age group, seen commonly in urban population, and was common among the Aryans. However, the exact predisposing factors could not be identified. The predominant fungi detected the *Acremonium* and *Candida* species. Patients with diabetes mellitus were relatively more prone to develop the FMS than normal. The importance of the fungal infections should be recognized and the possible preventive and treatment guidelines should be formulated for the patients. Further study is needed to know the various aspects of the fungal infections including in the immuno-compromised subjects.

References

1. Fergusson BJ. Fungal rhinosinusitis: spectrum of disease. Otolaryngol Clin North Am 2000; 33: 227-49.
2. Rupa V, Jacob M, Mathews MS. Increasing diagnostic field in allergic fungal sinusitis. J Laryngol Otol 2001; 115:636-8.

3. Lanza DC, Kennedy DW. Current concepts in the surgical management of nasal polyposis. J Allergy Clin Immunol 1992; 90: 543-5.
4. Deshazo RD, Chapin K, Swan RE. Fungal sinusitis. N Engld J Med 1997; 337:254-9.
5. Aher AR, Gujrathi UP, Shinde KJ. Incidence of fungal infections in chronic maxillary sinusitis. Indian J Otolaryngol Head Neck Surg 2000; 52:122-4.
6. Evan FO, Sydnor JB, Moore WEC et al. Sinusitis of maxillary antrum. N Engld J Med 1975; 293:735-9.
7. Grewal RS, Khurana S, Aujla KS, Goel SC. Incidence of fungal infection in chronic maxillary sinusitis. Indian J Pathol Microbiol 1990; 33:339-43.
8. Manning SC, Holman M. Further evidence for allergic pathophysiology in allergic fungal sinusitis. Laryngoscope 1998; 108:1485-96.
9. Schubert MS, Goetz DW. Evaluation and treatment of allergic fungal sinusitis. J Allergy Clin Immunol 1998; 102:387-94.
10. Lebowitz RA, Waltzman MN, Jacob JB, Pearlman A, Tierno PM. Isolation of fungi by standard laboratory method in patients with chronic rhinosinusitis. Laryngoscope 2002; 112:2189-91.
11. Ence BK, Gourley DS, Jorgensen NL, et al. Allergic fungal sinusitis. Am J Rhinol 1990; 4:169-78.
12. Ahmad-Al-Bhlal L Fungal infection of the nasal cavity and paranasal sinuses: review of 26 cases. Ann Saudi Med 1996; 16:615-21.
13. Rupa V, Jacob M, Mathews MS, Job A, Kurian M, Chandi SM. Clinical pathological and mycological spectrum of allergic fungal sinusitis in south India. Mycoses 2002; 45:364-7.
14. McClay JE, Marple B, Kapadia L et al. Clinical presentation of allergic fungal sinusitis in children. Laryngoscope 2002; 112:565-9.