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A Study on Determination of the Fungal Diseases of Nose and Paranasal Sinuses

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ABSTRACT
Humans most frequently develop fungal infections in their lungs, whether or not those infections spread through the bloodstream to other organs. On the other hand, localised fungal infection, which is more common than previously believed, may develop in the upper respiratory tract. Only dermatophytes may spread from one host to another and the majority of dangerous fungal species for humans cause opportunistic illness. A total of 80 patients with clinical characteristics indicative of fungal infection of the nose and paranasal sinuses were examined using a standard pro forma and performed the following investigation techniques when indicated. As preliminary investigations, hemograms, blood sugar levels, serum electrolytes, serum protein, blood grouping and other tests were performed to examine the overall health state and rule out any underlying illnesses. All patients had relevant X-rays of the nose and paranasal sinuses obtained and those who were tentatively diagnosed with fungal granulomas had CT scanning of the nose, paranasal sinuses and brain with contrast enhancement investigations. They were all of Indian descent. In this research, there were more females than males. Females made up 61.4 percent of the total number of cases in this research. The majority of cases were between the ages of 35 and 45. Our series of 80 patients was histopathologically proved to be allergic Aspergillus sinusitis in almost all of them. CT was shown to be quite useful for preoperative assessment and intra operative guiding. Fungal sinusitis was associated with nasal polyposis.

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Key Words
Allergic aspergillus sinusitis, nasal polyposis, fungal infection

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INTRODUCTION

An estimated 1.5 million different types of fungi exist on Earth, the vast majority of which are unidentified or poorly characterised[1]. Human exposure to fungi is inevitable since they are present everywhere and regular breathing frequently causes fungal components to be deposited inside the nose and paranasal sinuses[2]. Unless complicated cultivation techniques are used, the presence of fungal components in the nose is often minor and will go unnoticed. Rarely, fungi may cause sinonasal disease, with symptoms ranging from mild to severe enough to cause mortality or cerebral invasion. Whether or not the fungus invades nearby tissues, a characteristic that is closely linked to the health of the host's immune system, has largely determined how fungal rhinosinusitis is classified[3]. Noninvasive fungal rhinosinusitis instances include fungal colonisation, fungal balls and allergic fungal rhinosinusitis (AFRS). Fungus invasion of the local tissues is a defining feature of acute invasive, chronic invasive and chronic granulomatous fungal rhinosinusitis[4].

Humans most frequently develop fungal infections in their lungs, whether or not those infections spread through the bloodstream to other organs. On the other hand, localised fungal infection, which is more common than previously believed, may develop in the upper respiratory tract. Only dermatophytes may spread from one host to another and the majority of dangerous fungal species for humans cause opportunistic illness[5]. The prevalence of fungal infections and their mortality have both been grossly underestimated and the variety of fungi that can afflict immuno-compromised individuals is constantly growing. Fungal infections that affect the nose and sinuses include candidiasis and rhinosporidiosis in this era of AIDS, broad-spectrum antibiotics, cytotoxic drugs and organ donation. Examples of fungi infections include Aspergillus, actinomycosis, coccidioidomycosis, histoplasmosis, cryptococcosis, blastomycosis, sporotrichosis and nocardiosis. Martin and Berson noted a high prevalence in South Africa, which they connected in the majority of cases to malnutrition[6-8]. In our study, nasal polyps, nasal block, nasal discharge, headaches and proptosis were all signs of fungal infections. These symptoms all mimicked benign or malignant tumours of the nose and paranasal sinuses.

MATERIAL AND METHODS

After receiving clearance from the protocol review committee and the institutional ethics committee, the prospective and observational research was carried out at the Department of ENT. A total of 80 patients with clinical characteristics indicative of fungal infection of the nose and paranasal sinuses were examined using a standard pro forma and performed the following investigation techniques when indicated. As preliminary investigations, hemograms, blood sugar levels, serum electrolytes, serum protein, blood grouping and other tests were performed to examine the overall health state and rule out any underlying illnesses. All patients had relevant X-rays of the nose and paranasal sinuses obtained and those who were tentatively diagnosed with fungal granulomas had CT scanning of the nose, paranasal sinuses and brain with contrast enhancement investigations. The Consultant Microbiologist validated the clinical diagnosis of nasal fungal infection using microbiological testing. Following that, the Consultant ENT sent the patient to the lead investigator for testing inside the ENT department. Patients were asked to return for frequent check-ups after surgery. After the initial post-operative endoscopic evaluation and cleaning, every patient received nasal douching on the fifth post-operative day. Beclometasone aqueous nasal spray, antihistamine and vitamins were used to treat the patient. Patients were asked to return on the 15th post-operative day for an endoscopic inspection and cleaning, as well as whenever possible afterwards. Antifungal medication was not required for the patient with allergic Aspergillus sinusitis. The kind of fungal infection and its invasiveness were used to determine antifungal treatment (mucormycosis).

RESULTS AND DISCUSSIONS

In our analysis, the maxillary sinus was involved in 81.25 percent of cases. Next, 75 percent of the ethmoid sinus, 45 percent of the frontal sinus, 53.75 percent of the sphenoid sinus and 31.25 percent of all sinuses are involved. There were 35 men and 55 women among the 90 patients studied. They were all of Indian descent. In this research, there were more females than males. Females made up 61.4 percent of the total number of cases in this research. The majority of cases were between the ages of 35 and 45. (Table 1and table 2). In our research, all patients had nasal symptoms 85. (100percent). Nasal blockage, nasal discharge, postnasal discharge, frequent sneezing, diminished or full loss of smell (anosmia) and nasal bleeding are the symptoms. In our research, 20% of participants had proptosis, epiphora, diplopia, or blurred vision. (Table 3.) In our research, 90 patients had fungal culture. Thirty are Aspergillusflavus, nine are Aspergillus fumigates, eight are Aspergillusniger and three are Aspergillusterreus (Table 4). There are a wide variety of problems involved with fungus infections of the nose and paranasal sinuses, not just one disease entity. We looked into a variety of sickness causes, such as allergic A. sinusitis (80 cases). The appearance and clinical characteristics of these conditions are extremely similar, despite the fact that the treatment for them differs greatly and they could

Table 1: Gender distribution of the patients

Gender	Number	percentage
Male	35	36.2
Female	55	61.4

Table 2: Age distribution of the patients

Age	Number	percentage
below 25	18	19.71
25-35	24	27.21
35-45	42	51
above 45	6	6

Table 3: Clinical symptoms

Symptoms	Number of patients	percentage
1. Nasal Nasal obstruction Nasal discharge Post nasal Discharge	90	81
2. Headache	59	71
3. Ocular Proptosis Epiphora Diplopia Ophthalmoplegia	19	21

Table 4: Histopathology and fungal culture

Causative organism	Number of patient	percentage
Aspergillusflavus	32	38.1
Aspergillusfumigatus	11	12.21
Aspergillusniger	10	12
Aspergillusterreus	5	4.71
No growth	32	38.3

therefore be studied together due to this. We made an effort to analyse numerous illnesses under a single heading, making important differences as necessary[9-11].

The 80 patients evaluated were 30 men and 50 women. They all have Indian ancestry. There were more women than men in this study (Table 1). A total of 62.5 percent of the cases in this study were female. Most of the instances involved people between the ages of 35 and 45. In their study, Waman *et al*. discovered that allergic A. sinusitis was more common in women (65%). This is in line with the earlier research that have been published. All of the participants in our study had nasal issues. Nasal symptoms included nasal obstructions, nasal discharge, frequent sneezing, reduced smell (hyposmia), complete loss of smell (anosmia) and nose bleeding. 70% of our patients reported having a headache, which was the second most frequent symptom. With almost 20% of all instances, ocular symptoms such epiphora, diplopia and blurred vision were the second most common. The most common signs of allergic A. sinusitis, according to prior studies, are postnasal drainage and prolonged nasal obstruction[12,13]. These outcomes are in line with what we have seen.

All 80 patients in our investigation had nasal polyps and fungus tumours (100 percent). In 20% of the patients, proptosis, diplopia and ophthalmoplegia were noted. There are 80 different types of fungal diseases that can cause sinusitis. The most prevalent fungus in the environment, as well as the most typical species seen in fungal sinusitis in general and likely in allergic fungal sinusitis, is Aspergillus. Instead of culture data, the latter is mostly based on histology findings of fungi with morphologic features similar to Aspergillus. In our investigation, aspergillus was identified in every instance of fungal sinusitis. According to our research, A. sinusitis is entirely allergic. In their case series of 100 cases, Klossek *et al*. found that 94 percent of the patients had allergic A. sinusitis that was histopathologically confirmed. Pathogens in allergic A. sinusitis induced by various fungus have been described to include a number of other species. Australians, Aspergillus, Alternaria, Bipolarisspecifera B and Curvularia unata Microbiology labs' improved ability to discern between diverse hyphae with variation in the conical pores may be credited with the identification of these fungi[14,15]. In our investigation, every occurrence of allergic A. sinusitis was submitted for fungi culture. A fungal mass taken from the infected sinus cavity was the material provided for culture in each case.

Aspergillus was detected in 50 of the 80 cases, whereas the remaining 30 were negative. eighty patients There are thirty Aspergillus flavus, nine Aspergillus fumigates, eight Aspergillus niger and three Aspergilllusterreus. By HPE or culture inspection, no more fungal species were found in our study. All patients in this series had preoperative CT scans; MRI scans were not taken into consideration because of the expensive expense and the extremely little amount of additional information they would have provided in cases with fungal infections of the nose and paranasal sinus. All of the individuals in our series who had allergic A. sinusitis exhibited areas of noticeable alteration in the centre of the afflicted sinus on CT. These areas matched those where thick allergic mucin was found during surgery. In other cases, a material pattern, such as a starry sky, can be seen. These calcium concentrations appear to be present on bone windows. Understanding the full extent of the condition has been made possible thanks to CT scanning. A. sinusitis frequently has areas of both high and low density inside the sinuses. Bone windows offer a highly precise assessment of prospective invasion.
Typically, the maxillary sinus is the only series that Aspergillus affects. In 81.25% of the cases in our investigation, the maxillary sinus was affected. Involved sinuses include 31.25% of all sinuses, 45% of the frontal sinus, 53.75% of the sphenoid sinus and 75% of the ethmoid sinus[16].

In our study, endoscopic sinus surgery was performed on 80 individuals. In our long-term study, endoscopic sinus surgery showed a lower rate of morbidity and death, complete clearance and a low recurrence rate. Despite the fact that in our cases, functional endoscopic sinus surgery did not result in any problems. Only 12 occurrences of recurrence were observed. Each patient was released the same day without any issues. This agrees with earlier research.
We gave our patient both topically and internally

applied steroids. We frequently use tropical intra nasal steroids, with minimal systemic steroid treatment. In our experience, consistent use of tropical intra nasal steroids alone is helpful in preventing sickness recurrence. Tropical intra nasal steroids appear to function most effectively, nevertheless, after a course of oral corticosteroids. None of the allergic A. sinusitis patients in our group received antifungal medication. Similar findings from numerous authors have been reported, with the claim that the endoscopic approach is the only way to treat allergic A. sinusitis. However, according to other writers, the external approach can be useful in treating this condition, particularly when there is orbital (or) intra cranial enlargement. According to the level of morbidity and therapy needed to prevent persistent, serious complications following endoscopic sinus surgery, problems have been categorised as major or mild. In our study, 8 patients (10%) experienced intra operative hemorrhage, however there were no CSF leaks. A known severe complication is pheumocephalus and orbital hematoma (Markmay *et al.,* 1994). In our experiment, there was no localised cerebral haemorrhage, meningitis, brain abscess, diplopia, epiphora, or loss of vision.

Intracranial problems may be prevented by avoiding disturbing the mucosa that covers the ethmoid sinus roof. The vertical bony wall of the olfactory groove, which connects the middle turbinate to the roof of the ethymoid sinus, should be avoided because it may be extremely thin. Two further ideas, in our opinion, might help to stop cerebrospinal fluid leakage. In our study, synechiae were the moderate complication that was most frequently observed (30% of the time). The middle turbinate and the septum or lateral wall of the nose are the most common locations for this adhesion. During surgery, it is less likely that two adjacent raw surfaces may come into touch when the tissue is handled carefully. In order to prevent adhesion, the sinus cavity should be carefully cleaned after surgery. 24 of the 80 participants in our study had synechiae that required outpatient care and were successfully treated. The following minor complication, which accounts for 11.25 percent of all cases, is periorbital ecchymosis. The endoscopic sinus surgery revealed these issues. A lamina papyracea break frequently results in this. The most frequent cause of lamina papyracea breach is uncinectomy during endoscopic sinus surgery, according to earlier studies. Post-treatment endoscopic monitoring is essential for long-term success because recurring disease is common. Additionally, a patient's symptoms by themselves are insufficient to indicate a persistent or recurring illness. The best long-term outcome after surgery will be achieved with the complete and radical elimination of fungal debris, as well as attentive frequent follow-up with intranasal steroids and, if necessary, systemic steroids used sparingly[17,19].

CONCLUSION

Our series of 80 patients was histopathologically proved to be allergic Aspergillus sinusitis in almost all of them. CT was shown to be quite useful for preoperative assessment and intra operative guiding. Fungal sinusitis was associated with nasal polyposis.

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