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PREVALENCE OF FUNGAL ISOLATES IN UNILATERAL SINONASAL DISEASE

Otorhinolaryngology

Dr. Somu Lakshmanan	Professor & HOD Sri Ramachandra Medical College and Research Institute, otorhino laryngology Porur, Chennai, Tamil Nadu, India. PIN- 600116.
Dr. Valliammai Thiyagarajan	Senior Resident Karpagam Faculty of Medical Sciences And Research, Otorhino laryngolgy, Coimbatore, Tamilnadu, India. PIN-641032.
Dr. Bharath Iyachamy	Senior Resident Sri Ramachandra Medical College and Research Institute, otorhino laryngology Porur, Chennai, Tamil Nadu, India. PIN- 600116.
Dr. Deepak Genedi*	Post Graduate Sri Ramachandra Medical College And Research Institute, Otorhino Laryngology Porur, Chennai, Tamil Nadu, India. Pin- 600116. *Corresponding Author

ABSTRACT

Fungal sinusitis has been on a rising trend and poses a health burden. Our study aims to find out the prevalence of fungal isolates in unilateral sinonasal disease and its association with diabetes mellitus. A prospective study was conducted for 2years from August 2017 to August 2019. 150 patients were selected for study based on history, Diagnostic nasal endoscopy and radiological findings. Patients were subjected to Functional Endoscopic Sinus Surgery (FESS). Sample collected has been sent for fungal smear, fungal culture and Histopathological examination. 50 (33.3%) patients were diagnosed with fungal rhinosinusitis based on fungal smear positivity and histopathology showing fungal elements. 100 (66.7 %) patients were categorized as non-fungal rhinosinusitis. Among the cases of fungal rhinosinusitis, 28 patients (56% of fungal rhinosinusitis) were diagnosed as allergic fungal rhinosinusitis, 15 patients (30% of fungal rhinosinusitis) were diagnosed as acute invasive fungal rhinosinusitis and 7 patients (14 % of fungal rhinosinusitis) were categorized as a fungal ball. A strong association has been found between fungal sinusitis and diabetes mellitus.

KEYWORDS

Fungal sinusitis, Unilateral sinusistis

INTRODUCTION-

Rhinosinusitis is a term for a group of disorders characterised by inflammation of the sinonasal mucosa. It can present as acute rhinosinusitis or chronic rhinosinusitis when it lasts for > 12 weeks. Proper diagnosis and classification are essential to aid in the recommended treatment strategy and prognosis. Because of its high prevalence and inconsistent presentation rhinosinusitis can be misdiagnosed. (1)

Unilateral versus bilateral involvement of sinuses should be looked upon as they can offer various differential diagnoses. Bilateral sinusitis is commonly caused by acute bacterial infection. Unilateral sinus involvement can be due to benign conditions like antrochoanal polyp, fungal rhinosinusitis, Inverted papilloma and sinonasal malignancy. Numerous studies are available on bilateral sinusitis and the common etiologies, this study was designed to estimate the prevalence of fungal isolates in unilateral sinonasal disease.

The spectrum of fungal involvement in rhinosinusitis ranges from benign colonization to potentially life-threatening disease. Fungal rhinosinusitis can be categorized further as invasive and non -invasive forms. This classification is based on the presence of fungus in the tissue (blood, bone or mucosa) (2,3).

Fungal colonization of the airways can occur due to the ubiquitous presence of fungal spores in the air. Environmental and host conditions help in determining the virulence of the fungus. Aspergillus species are the most prevalent colonizer of the sinuses. (4,5)

Non-invasive fungal rhinosinusitis includes fungal ball, allergic fungal rhinosinusitis. It can occur in immunocompetent individuals. Invasive fungal rhinosinusitis is also called fulminant or necrotizing fungal sinusitis. It invades the blood vessels and bone. Diagnosing invasive fungal rhinosinusitis at the earliest is essential for its prompt management. It is caused commonly by fungi of the zygomycetes family namely Rhizopus, Mucor. It afflicts primarily diabetics, immunocompromised hosts. It progresses at a rapid speed and is lethal to the patient if inadequately managed. (6,7)

This is an institutional study to identify the prevalence of fungal rhinosinusitis in unilateral sinonasal disease. The co-existence of Type II diabetes mellitus in fungal sinusitis is also analysed in this study. Diagnosis of the unilateral sinonasal disease is by clinical examination, diagnostic nasal endoscopy (Fig 1A &1B) and computed tomography. The presence of fungi is identified from nasal swabs and histopathology. Fungal smear is done commonly with 10% KOH and culture with Sabouraud's dextrose agar. The presence of septate or aseptate hyphae helps in the classification of invasive and non-invasive fungi. The presence of fungal elements in histopathology also aids in diagnosis.

Figure 1A- Endoscopic image showing features of invasive fungal rhinosinusitis

Figure 1B- Endoscopic image showing features of allergic fungal rhinosinusitis

METHODS:-

This is a cross-sectional study of patients diagnosed with a unilateral sinonasal disease for 2years (August 2017 to August 2019) in our

tertiary care hospital. The study was approved by the institutional ethics committee. It includes 150 patients with ages greater than 16years and diagnosed to have a unilateral sinonasal disease. (Figure - 2) Cases of bilateral sinusitis, benign or malignant tumours of the nose and paranasal sinuses and granulomatous conditions of the nose were excluded. All patients included in the study underwent Diagnostic Nasal Endoscopy (DNE) and plain computerised tomography scan of paranasal sinuses. Based on the finding all patients underwent Functional Endoscopic Sinus Surgery (FESS). Sample sent for fungal smear, fungal culture and Histopathological Examination. Patients were grouped into fungal rhinosinusitis and non-fungal rhinosinusitis based on reports.

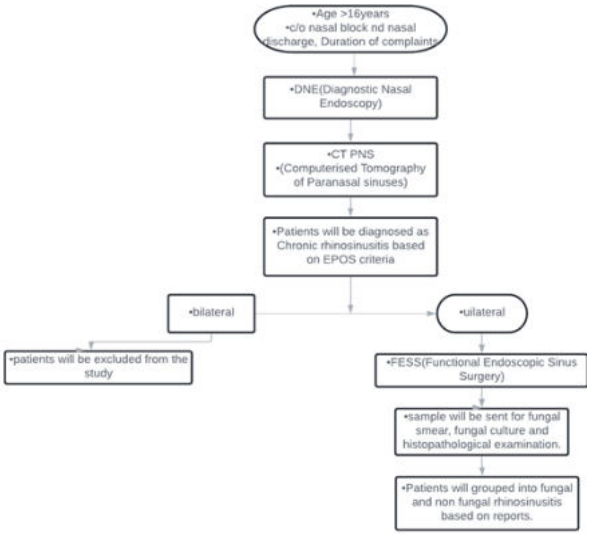

Figure 2- Flow chart showing the methodology

RESULTS-

Out of 150 patients selected for the study, 50 (33.3%) patients were diagnosed with fungal rhinosinusitis based on fungal smear positivity and histopathology showing fungal elements. 100 (66.7 %) patients were categorized as non-fungal rhinosinusitis.

TEST	NEGATIVE	POSITIVE	
Fungal Smear	100	50	35 - SEPTATE HYPHAE 15 - ASEPTATE HYPHAE
Fungal Culture	114	36	22- ASPERGILLUS SPECIES 14 - MUCOR SPECIES
HPE(HistoPathological Examination)	101	49	

DISCUSSION

The unilateral sinonasal disease is commonly encountered in practice and represents an issue of major concern since neoplasms may mimic inflammatory conditions. Fungal rhinosinusitis is on the rising trend in recent years. We conducted a period prevalence study of 150 patients and identified the number of cases of fungal rhinosinusitis. Out of 150 patients selected for the study, 50 (33.3%) patients were diagnosed with fungal rhinosinusitis based on fungal smear positivity and histopathology showing fungal elements. 100 (66.7 %) patients were categorized as non-fungal rhinosinusitis. Among the cases of fungal rhinosinusitis, 28 patients (56% of fungal rhinosinusitis) were diagnosed as allergic fungal rhinosinusitis, 15 patients (30% of fungal rhinosinusitis) were diagnosed as acute invasive fungal rhinosinusitis and 7 patients (14 % of fungal rhinosinusitis) were categorized as fungal ball.

In the group of fungal rhinosinusitis with 50 patients, 28 patients were females and 22 male patients. On analysing the distribution of age groups, fungal rhinosinusitis was more prevalent in the age group of 31 to 60 years. Mean age of fungal rhinosinusitis was 48.42 ± 14.8 SD Supawan Laohasiriwong et al in a descriptive study have documented that the prevalence of fungal infection in unilateral rhinosinusitis was 39% and bacterial infection was found in 60 % (8). In another study by Usha Krishnan et al the prevalence of fungal rhinosinusitis in unilateral sinonasal disease was 44 % (9). In the study by Lehenerdt et al, only 7 % had unilateral fungal rhinosinusitis and 37% had tumours. (10). Similarly in a study by Ikeda et al from Japan, only 8.6 % of patients had unilateral fungal rhinosinusitis. (11). Studies carried out abroad have had a lesser prevalence of fungal rhinosinusitis whereas in a tropical country like India the prevalence of fungal rhinosinusitis with special reference to allergic fungal rhinosinusitis is more.

Sudhir M Naik et al did a retrospective study and observed that in 46 cases of fungal rhinosinusitis, 78.2% (36 cases) had fungal ball and 17.39% (8 cases) had invasive fungal sinusitis. (12) Michael et al did a study on the mycological profile of fungal sinusitis in a tertiary hospital in Tamil Nadu and found that 63 % of the cases had AFRS and 10 % Acute invasive rhinosinusitis (13).

Nasal symptoms were predominant in the fungal rhinosinusitis group and contributed to 68 %. The majority of the extra nasal symptoms like proptosis decreased visual acuity, intracranial features were due to acute invasive fungal rhinosinusitis. Cases of Allergic fungal rhinosinusitis also had extra nasal features of proptosis. (Table 1) Ashish Vashisth et al have done an interesting case series of 11 patients with extensive allergic fungal rhinosinusitis with ophthalmic and skull base complications (14). In our study with 15 cases of invasive fungal rhinosinusitis, we had a mortality of only 1 patient despite aggressive treatment.

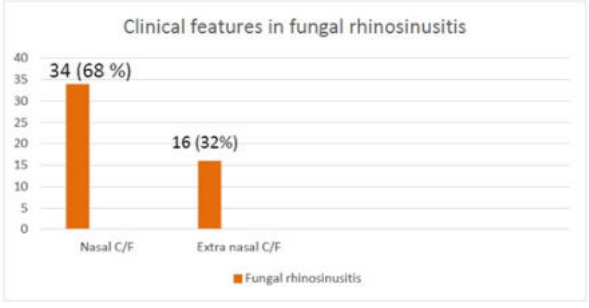

Table 1:- Bar Chart Showing The Clinical Features In Fungal Rhino Sinusitis

A strong association of type II Diabetes mellitus and fungal rhinosinusitis was observed. All cases of invasive fungal rhinosinusitis had uncontrolled type 2 diabetes mellitus. The high prevalence of invasive fungal rhinosinusitis in our country could be due to the high prevalence of diabetes in our country.

In our study of 150 patients, maxillary sinus was involved in 54 % of the cases followed by the sphenoid in 6 % of the cases. (Table 2) But in similar studies, diagnosis of inverted papilloma, malignancies and observed that maxillary sinus was commonly involved in unilateral sinonasal disease. One of the many reasons for maxillary sinusitis being more common is the obstruction in antral drainage secondary to the complex network of the osteomeatal complex.

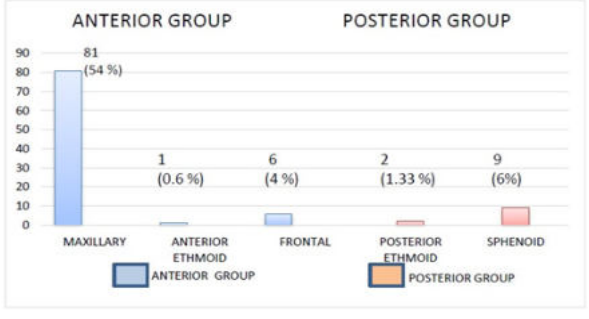

Table-2:- Bar Chart Showing The Sinuses Involved In Unilateral Sinonasal Disease.

CONCLUSION

The prevalence of fungal isolates in unilateral sinonasal disease was observed to be statistically significant. Allergic fungal rhinosinusitis and fungal ball were prevalent in the middle age group and invasive fungal rhinosinusitis was more prevalent in the elderly group which includes patients who are 61 years of age and above. A statistically significant correlation of invasive fungal rhinosinusitis with type 2 Diabetes mellitus is present. The maxillary sinus is the most common

sinus to be involved in unilateral sinonasal disease. For any patient with orbital symptoms and uncontrolled type 2 Diabetes mellitus it is essential to suspect invasive fungal rhinosinusitis which is best treated at the earliest.

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