



A Clinicomorphological study of Fungal Rhinosinusitis

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Abstract :

The prevalence of rhinosinusitis is estimated to be 14 percentage of the global population. Chronic rhinosinusitis (CRS) is a multifactorial problem caused by interaction of numerous host and non-host factors leading to the disease. The host factors are anatomic variations like septal deviation, nasal polyposis, cystic fibrosis (CF), Youngs syndrome, primary ciliary dyskinesia and immunocompromised state. The environmental and other non-host factors are cigarette smoking, atopy, fungal infection and bacterial infection. The most common cause of bacterial rhinosinusitis is coagulase-negative staphylococci, Hemophilus influenzae, Staphylococcus aureus, and Streptococcus pneumoniae. Fungi as a causative agent of sinusitis are on the rise and allergic fungal rhinosinusitis (AFR) accounts for 5 -10 percentage of all CRS cases. The organisms usually implicated are Aspergillus species and organisms in the Mucorales order (Rhizopus, Rhizomucor, Absidia, Mucor, Cunninghamella, Mortierella, Saksenaea and Apophysomyces).

There exists a demographic variation in the fungi causing rhinosinusitis with the dematiaceous fungi being the most common cause of rhinosinusitis in the west, while aspergillus is implicated as the most common cause of rhinosinusitis in India. Hence we report the histomorphology of fungal sinusitis diagnosed in our hospital from January 2012 to August 2013 and present the results with a discussion.

Keyword :

Fungal rhinosinusitis - Aspergillosis - Mucormycosis

INTRODUCTION:

Acute or chronic rhinosinusitis is a common condition affecting up to 20% of the population (1). Fungal rhinosinusitis (FRS) once considered a rare disorder, is now being recognized and reported with increasing frequency worldwide. In India this disease was initially considered to be prevalent only in northern regions, but is now being reported from other parts of the country as well. The etiological agents of fungal sinusitis reported from India vary

from those of the western countries wherein dematiaceous fungi are more common while in India aspergillus species is more common.

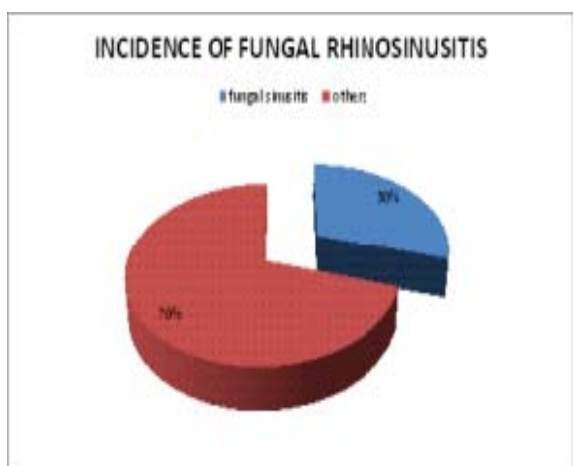
METHODS AND MATERIALS:

A retrospective analysis of rhinosinusitis cases reported from January 2012 – August 2013 were analyzed. A total of 169 cases of sinusitis were studied with the age group ranging from 15 to 70 years. All clinical details were retrieved from the patients' record files, including culture reports if any.

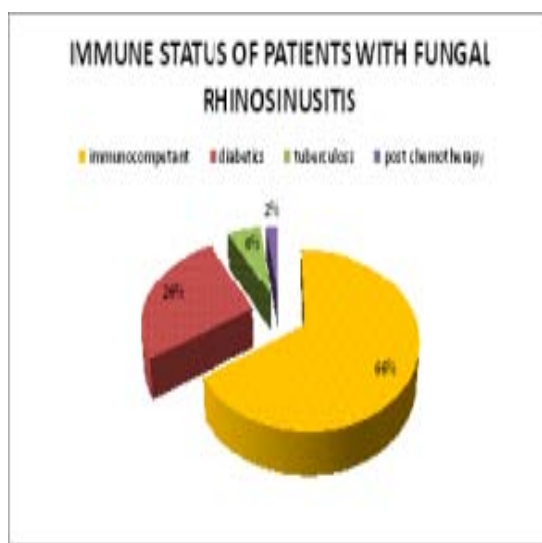
RESULTS:

Of the 169 cases diagnosed as rhinosinusitis, 53 were of fungal etiology. The incidence of fungal

Of the 53 cases of fungal sinusitis 18 were women and 35 men (Chart.2). The age of patients ranged from 15 yrs to 70 yrs. The peak incidence was seen in 3rd to 4th decades of life. All had varied non-specific symptoms like fever, facial or sinus pain and headache. Visual loss, proptosis, and periorbital edema were present in 2 patients.

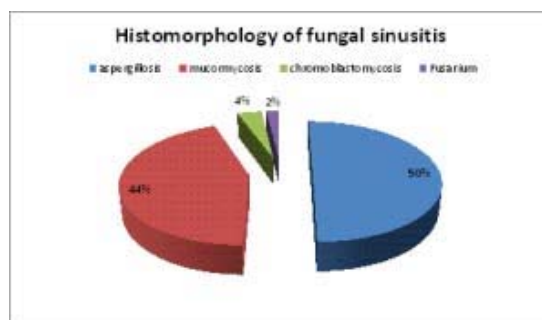
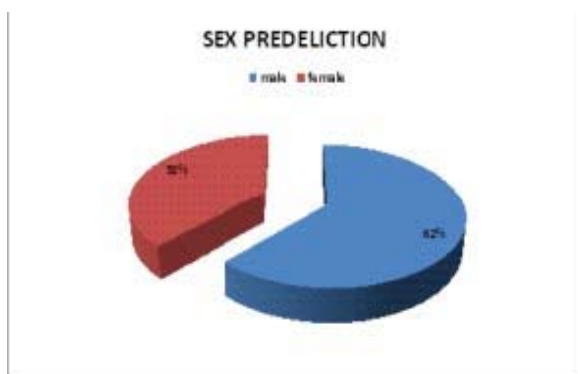


sinusitis inferred from our study is 29.58 %. (Chart.1)



Of the 53 cases reported as fungal sinusitis, an immunocompromised status was identified in 16 patients. Among these 16 patients, 12 were diabetic, 3 were known case of tuberculosis and one patient was on chemotherapy. (Chart.3)

Paraffin embedded sections from those cases reported as fungal sinusitis showed presence of fungal



hyphae. The most frequent organism was *Aspergillus* seen in 26 cases (50%); *Mucor* was recovered in 23 cases (44.23%). 2 cases (3.65%) of *Chromoblastomycosis* and one case of *fusarium* sp.(1.92%), constituted the rest (Chart.4). A granulomatous reaction was seen in two cases.

Culture reports were available only for 6 cases and the organisms isolated were

Aspergillus flavus - 2

Aspergillus fumigatus -1

Rhizopus - 1

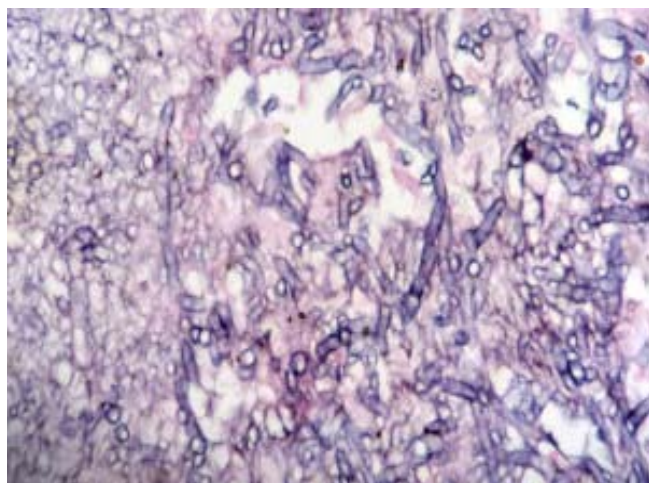
Mucormycosis - 2



Fig.1- Aspergillosis

Fig.2 – Mucormycosis

***Chromoblastomycosis* is identified by the presence of pigmented fungal hyphae. (Fig.3).**



Aspergillus was identified by slender septate hyphae of uniform width, having acute angle branching.(Fig.1)

Mucormycosis is identified by broad, irregular aseptate hyphae, having wide angle branching. (Fig.2.)

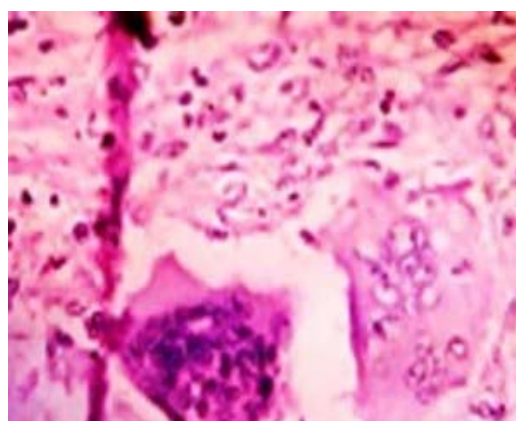
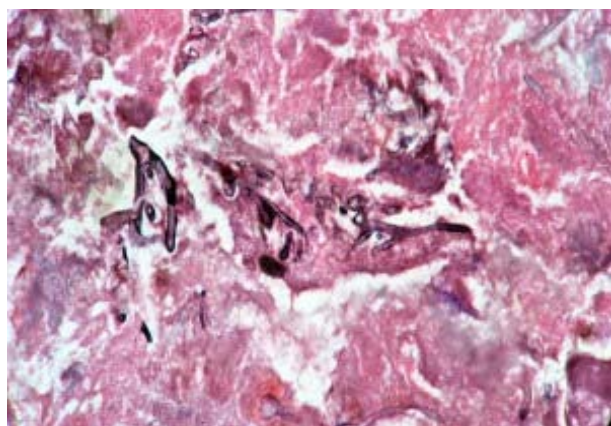


Fig.3 - Chromoblastomycosis

Fig.4 – Granulomatous reaction



DISCUSSION:

Sinonasal fungal disease was initially described in the 1600s. There is geographic diversity which may be due to different climates and environmental factors, as well as different means of fungal exposure. A uniform conclusion has been arrived in varied studies showing non-invasive disease being more common than invasive counterparts. Rhinosinusitis is a common

disorder affecting approximately 20% of the population. The incidence of fungal rhinosinusitis in our set up is 29.58%. Symptoms include fever, facial pain or numbness, nasal congestion, serosanguinous nasal discharge and epistaxis. In immunocompromised patients intraorbital, intracranial and maxillofacial extension is common with resulting proptosis, visual disturbances, headache, mental status changes, seizures, neurologic deficits, coma, and maxillofacial soft-tissue swelling. Noncontrast CT in case of acute sinusitis demonstrates hypoattenuating mucosal thickening or an area of soft-tissue attenuation within the lumen of the involved paranasal sinus and nasal cavity. In allergic fungal sinusitis a hyperattenuating allergic mucin is seen within the lumen of the paranasal sinus. Fungus ball appears as a mass within the lumen of a paranasal sinus with maxillary sinus being the most commonly involved sinus (3). Predisposing factors include anatomic abnormalities, nasal polyposis, deviated nasal septum and foreign bodies. In our study, 47 cases diagnosed as sinusitis had nasal polyposis. On gross examination, the sinus contents appear as peanut butter-like, inspissated mucus material that is usually green, brown, or grayish in color. There are 4 types of sinonasal fungal disease: chronic indolent invasive sinusitis, fulminant fungal sinusitis, fungus ball and allergic fungal sinusitis (AFS). Chronic indolent invasive fungal sinusitis is of 2 types: chronic invasive granulomatous sinusitis and chronic invasive fungal sinusitis (1). The most common causative fungal organism is *Aspergillus flavus*. Chronic invasive fungal sinusitis is most commonly associated with *Aspergillus fumigatus*. Fulminant (angioinvasive) fungal sinusitis is often seen in immunosuppressed patients, particularly in patients with hematologic malignancies and diabetes, although occasionally the disease may develop in immunocompetent individuals. The organisms usually implicated are *Aspergillus* species and organisms in the Mucorales order (*Rhizopus*, *Rhizomucor*, *Absidia*, *Mucor*,

Cunninghamella, *Mortierella*, *Saksenaea* and *Apophysomyces*). *Aspergillus* is identified by slender, septate hyphae of uniform width, having acute angle branching. Mucormycosis is identified by broad, irregular aseptate hyphae with wide angle branching. Chromoblastomycosis is identified by the presence of pigmented fungal hyphae. A granulomatous reaction as identified by the presence of foreign body type of granulomatous reaction is elicited by fungal hyphae in rare cases. The mainstay of treatment for AFS has been endoscopic sinus surgery with removal of nasal polyps, clearance of fungal debris and aeration of the sinuses is generally adequate for achieving disease clearance, although follow up care remains essential to detect recurrences (4). Non-invasive disease is treated by surgical debridement and sinus ventilation only, though additional oral or local corticosteroid therapy may be beneficial in allergic type. For invasive disease, the adjuvant medical therapy is recommended to prevent recurrence and further extension (itraconazole is an effective drug in such situation). Patients with acute necrotizing sinusitis require radical surgery and amphotericin B therapy (5).

CONCLUSION:

The retrospective study conducted in our institution has shown that the incidence of fungal sinusitis is more in our institute, when compared to western statistics (29.58% vs 20%). This is probably due to the fact that our institution is a tertiary care center. The incidence is found to be more common in males. More cases occurred in the age group of 30 to 40 years. The most common causative

agent is aspergillus species. Aspergillus was seen in 50% of cases, followed by mucormycosis - 44%. Chromoblastomycosis and fusarium were found to be rare cause. The commonest types of fungi isolated from FRS is similar to that seen in other parts of India, but differs from that of western countries, where dematiaceous fungi are the most common causes for fungal rhinosinusitis.

REFERENCES:

1. Kathleen T. Montone, MD: Infectious Diseases of the Head and Neck - A Review Am J Clin Pathol 2007;128.

2 Rajiv C Michael, Joy S Michael, Ruth H Ashbee, Mary S Mathews : Mycological profile of fungal sinusitis: An audit of specimens over a 7-year period in a tertiary care hospital in Tamil Nadu. Indian journal of clinical pathology and microbiology. 2008;51(4):493-496.

3 Manohar Aribandi, MD, Victor A. McCoy, MD and Carlos Bazan, MD: Imaging Features of Invasive and Noninvasive Fungal Sinusitis: A Review. RadioGraphics. 2007 (September); 27: 1283-1296.

4 A. Ravikumar, A.Mohanthy, R. P. Vatsanath, S. Raghunandhan Allergic fungal sinusitis a clinicopathological study. Indian Journal of Otolaryngology and Head and Neck Surgery. 2004 (October-December);56 (4):317-320.

5 stacey E Mills. Sternberg's Diagnostic Surgical Pathology, 5th Edition. 2010. Chapter 21. p861-862.