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ORIGINAL ARTICLE

Microbiological analysis of paranasal sinuses in chronic sinusitis – A south Indian coastal study

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KEYWORDS

Chronic sinusitis;
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Abstract *Introduction:* In contrast with the well established roles of microbes in the etiology of acute sinusitis, the exact roles of all of these microbes in the etiology of chronic sinusitis are uncertain. The objective of the study is to analyze micro-flora present in patients with chronic sinusitis in the coastal belt of India.

Methods: A cross sectional study was done to analyze the microorganisms of paranasal sinuses in patients having chronic sinusitis undergoing a functional endoscopic sinus surgery. Biopsy/Swabs were taken from the infected sinus of the patients during surgery and were sent for microbiological analysis within 4 h of collection.

Results: *Staphylococcus aureus* was the most common isolate accounting for 43% of the patients followed by *Klebsiella* spp., 9% and MRSA, 3%. Fungal organisms identified were *Aspergillus* and *Candida* spp. isolated from 9% of the patients, which is very high compared to the other studies. No anaerobes were isolated.

Discussion: The possibility of a fungal infection should always be considered in the differential diagnosis of difficult to treat diseases of the paranasal sinuses especially in tropical coastal regions.

Conclusion: Based on results we can vary the choice of antibiotics in chronic and acute rhinosinusitis leading to a better management of the condition.

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1. Introduction

Chronic sinusitis is an infection of sinuses lasting for more than three months. Despite of its prevalence the disease remains with poorly understood origin, pathogenesis and natural history. The etiology of chronic sinusitis continues to be the focus of much debate and research in the field of rhinology.[2] With initial use of antibiotics and agents that decrease mucosal edema now surgical methods are employed in whom medical treatment fails. Although diagnostic criteria for acute sinusitis are well established yet the definition of chronic

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sinusitis is controversial with respect to the importance of bacteria in the initiation and progression of disease. Chronic sinusitis has been considered to be chronic inflammatory condition rather than microbial infection. The role of bacteria in the pathogenesis of chronic sinusitis is currently being reassessed.[4]

The use of endoscopies has made it possible to determine the microbiology of each sinus with a lower probability of contamination.[3] Persistence of infection causes mucosal changes such as loss of cilia, edema and polyp formation.

We feel that lack of progress is largely due to paucity of knowledge in microbiology and histopathology of chronic sinus disease available to us. This was the impetus of our study to evaluate the microbiology of chronic sinusitis in patient undergoing functional endoscopic sinus surgery.

2. Materials and methods

This is a cross-sectional study in the department of otorhinolaryngology at the Kasturba medical college and allied hospitals. The sample size is of 100 patients of all age groups and both males and females were considered in the study done from October 2009 to 2011.

2.1. Inclusion criteria

(a) Patients with chronic inflammatory disease of sinuses undergoing functional endoscopic sinus surgery,
(b) Allergic rhinitis patients with chronic sinusitis not responding to medical treatment,
(c) Patients with chronic sinusitis with no response to medical treatment,
(d) Patients with recurrent sinusitis (>4 episodes/year) and chronic sinusitis not responding to medical treatment with complete opacification or mucosal thickening of >5 mm in one or two maxillary or ethmoidal sinuses in CT,
(e) Patients not on antibiotics at least one week before the surgery were included in the study.

2.2. Exclusion criteria

The patients with acute sinusitis, malignancy of paranasal sinuses and patients on recent antibiotics were excluded from study.

During surgery, nasal cavity was disinfected with poviodine solution/chlorhexidine solution, swabs/biopsies were taken from the infected sinuses. Two biopsies/swabs were taken, one for aerobic and fungus, and another for anaerobic microorganisms. All biopsies/swabs were collected in a sterile container then inoculated into the culture media within 1–4 h of collection.

For aerobic culture, biopsies/swabs were inoculated in Mac Conkey agar and Chocolate agar.[1] The specimens were incubated at 35° C in a 5% carbon dioxide environment. The plates were evaluated daily for at least two days for any microbial growth. For anaerobic culture, biopsies/swabs were transported via thioglycolate broth and later inoculated in Schaedler agar.[3] These were incubated anerobically at 35° C[11], and evaluated for any microbial growth daily for at least five days. Fungal analysis was done by KOH mount and culture on Sabouraud Chloroamphenicol agar.[6,7] Data analysis was done by SPSS ver.11.5 and study was evaluated using the Chi-Square test.

3. Observations and results

During the period of study, 100 patients with chronic sinusitis entered into the study. The average age of the patients was 41 years (range 10–70 yrs). There were 60 males and 40 females in our study. The average duration of symptom was 20 months, ranged from less than 10 months to more than 30 months. The most common symptom was headache in 78%. Other symptoms noted were nasal obstruction in 76%, nasal discharge in 54%, recurrent sneezing in 34%, disturbance of smell in 21%, and epistaxis in 6%. (Table 1). History of allergy was present in 66% of patients who underwent surgery. On examination, 96% of patients had deviated nasal septum and 44% had congested nasal mucosa. On CT scan almost all patients had mucosal thickening with the DNS, and both CT scan and intra operative findings were similar.

On microbiological analysis of the biopsy/swab from infected sinuses, 51.24% were aerobic (both seen on smear and isolated); 41.32% were aerobic organism (seen only on smear not isolated) and 7.4% were fungi (Table 2). Of all the pathogens, in the aerobic group, Staphylococcus aureus was the most common organism isolated, seen in 43 out of 100 specimens (43%). The other organisms were Klebsiella spp. which was isolated in 9 out of 100 (9%) specimens and the rest being MRSA, 3 of 100 (3%) specimens. Streptococci which are again group A and group B hemolytic were isolated in one each of 100 specimens. Citrobacter spp., Botromycosis spp., Acinobacter spp., Enterobacter spp. and Pseudomonas spp. were seen

Table 1 Symptoms of the patients.

Sypmtoms	No of patients	Percentage
Nasal discharge	54	54
Nasal obstruction	76	76
Headache	78	78
Disturbance of smell	21	21
Epistaxis	6	6
Sneezing	34	34
Sore throat	1	1
Hawking	1	1

Table 2 Result of microbiological analysis (Total 121 organisms).

Result	No. of positives	Percentage
Aerobic organisms (Both seen on smear and isolated)	62	51.24
Aerobic organism (Seen on smear but not isolated)	50	41.32
Anaerobic organisms	0	0
Fungus	9	7.4

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