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RESEARCH ARTICLE

PROSPECTIVE STUDY OF FUNGAL DISEASES OF NOSE AND PARANASAL SINUSES.

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Abstract

Introduction:-

The fungal infections mainly presents with nasal polyps, nasal block, nasal discharge, headache, and proptosis mimicking benign or malignant tumours of the nose and paranasal sinuses.

The warm climate in Tamilnadu with its high attendant rate of allergic, hypertrophic, vasomotor rhinitis and rhinosinusitis provides one of the pre-requisites for fungal infections of the upper respiratory this tract. Of the fungal infections of nose and para-nasal sinuses, Aspergillosis tops the list in terms of occurrence. Here, the ENT Department, Government Rajaji Hospital, Madurai with its advanced facilities serves as a referral centre provides various possibilities for carrying out a study in fungal infections focussing mainly on opportunistic infections of the nose and para-nasal sinuses. The lack of recognition of this disease and the scarcity of the reports prompted us to undertake the study.

Aim of The Study:-

To study the epidemiology of fungal infections of the nose and para nasal sinuses in our region
To study the clinical and pathological manifestations of fungal infections of the nose and paranasal sinuses
To evaluate the role of CT scan in diagnosing the fungal diseases of nose and para nasal sinuses
To evaluate different modalities of treatment and their results

Materials and Methods:-

The materials for the present study were collected from patients who attended the outpatient department of ENT, Government Rajaji Hospital, Madurai between 2015 to 2016.

A total of 25 patients who had clinical features suggestive of fungal infections of nose and paranasal sinuses were evaluated using a standard proforma and underwent the following investigative procedures systematically as and when needed

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Haematological investigations:
Complete haemogram, Blood sugar level, serum electrolytes, serum proteins, blood grouping etc., were done as preliminary investigations to assess the general health condition as well as to rule out any underlying disorders.

Radiological Procedures:
Relevant X-rays of the nose and paranasal sinuses were taken for all patients and those who were provisionally diagnosed as fungal granulomas were subjected to CT scanning of the nose, paranasal sinuses and brain with contrast enhancement

Immunological Procedures:
Cutaneous reactivity to Aspergillus species was tested by the prick test.

Pathological Diagnosis:
Biopsied materials were placed in three sterile bottles as follows
Bottle A with sterile normal saline for staining gomori methenamine silver stain.
Bottle B with sterile normal saline for fungal culture
Bottle A& B were transported to the microbiology lab within one hour of the procedure
Bottle C sent to th pathology department of Histopathological examination.

Bottle A specimen was mounted with methenamine silver. This dissolves or makes the tissue elements translucent and the fungi are easily observed when examined as a wet preparation fungal elements stained black, early visible
Bottle B specimen was sent for fungal culture to Aravind Eye Hospital. It was cultured on Potato-Dextrose agar (PDA) The best grade of white Potatoes should be used. They should be washed and sliced, unpeeled at the rate of 250 g/l of water and allowed to steam for 1 hr in an autoclave with its exhaust open. The filtrate should be distinctly turbid. A clear filtrate is to be avoided Agar and dextrose one added to give serial concentration of 2% each and the whole in then tubed autoclaved and stained for use. Properly made, each tube showed have a small button of sedimented material in its base. Potato-dextrose agar made in this manner in an excellent medium, this interval can sometimes be hastened by reducing the concentration of dextrose to 1% When growth was present, a bit of growth was removed from the colony, tested apart in a drop of water and examined as a wet preparation. Slide cultures show the structure and arrangement of the growth and true morphology and hence were used. These cultures were prepared by adding a bit of growth to a small portion of agar on a slide. A coverslip was place on top and the slide was incubated in a most petridish. After a week, when the spores had matured, the cover slip and the medium were gently removed. A drop of methenamine silver was added and the coverslip replaced. The preparation was then examined under microscope. Some of the mycelium would have adhered to the slide and the spore heads, conidiophores etc., will be intact and seen in their characteristic arrangement. Aspergillus species was easily identified by the presence of typical conidiophores Bottle C was used for routine histopathological examination the specimen under low and high power magnification with a of light microscope

Our treatment policy:-
The adequate management of fungal infections of the Nose and sinuses at our institute revolves around five major principles
Timely diagnosis, usually dependent on a high index of suspicion.
Control of local and systemic predisposing factors Surgical debridement geared to the level of invasiveness of the fungus Anti-fungal treatment Long term follow up
All the patients in this study underwent surgical procedures like

Endoscopic Sinus Surgery:-
Endoscopic Assisted External Fronto-SphenoEthmoidectomy:-
Post-operatively patients were advised to come for regular follow up. The nasal douching was given to every patient from the 5th post-operative day after the first postoperative endoscopic examination and cleaning Patients were treated by beclomethasone aqueous nasal spray, anti-histamines and vitamins.

The patients were requested to come for follow up on the 15th post-operative day for endoscopic examination and cleaning and whenever possible thereafter. (usually once in a month) Patients with Allergic as sinusitis did not require antifungal therapy. Anti-fungal therapy was given based on the type of fungal infections and its invasiveness (mucormycosis).

Commonly Amphotericin B IV form : 1.5 mg/kg/day for 6 to 10 weeks, which is increased daily by 0.4 to 0.6 mg/kg during the course of the treatment Tab. Ketaconazole was also used as 200 mg once daily for 3 weeks checking the liver function tests in between.

Observation:-

AGE

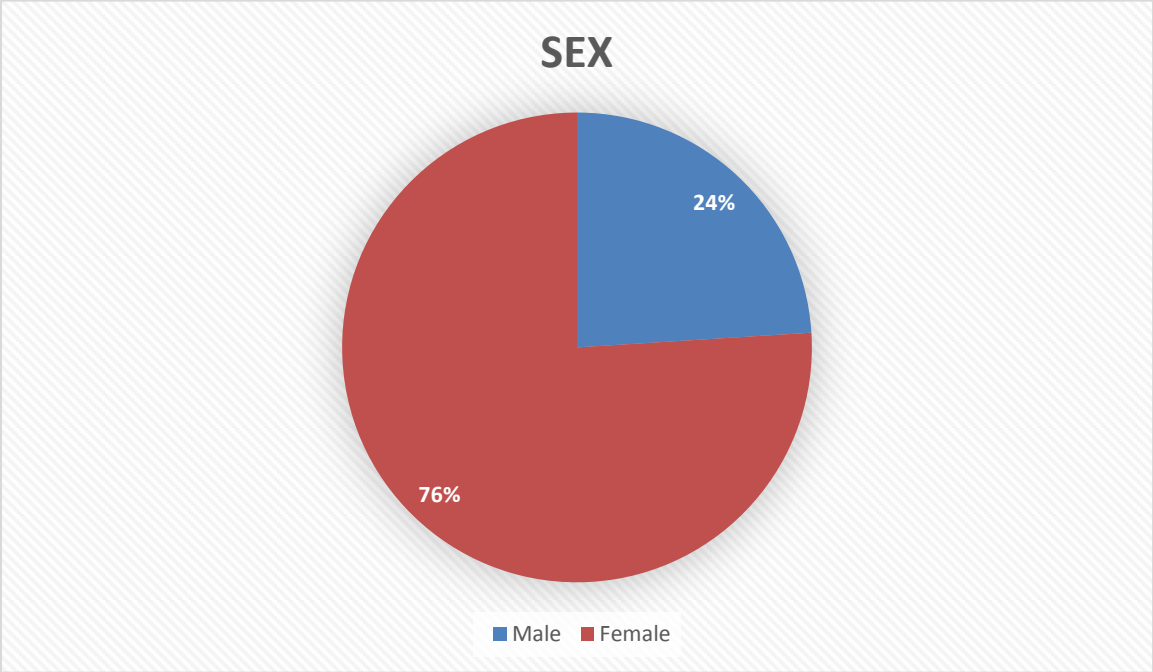
Number of cases in this study :25

Age (Years)	No. of patients	Percentage %
<20	5	20
21-40	15	60
41-60	5	20
>60	-	0

The majority of cases were in 2nd group, is between 21-40 years.

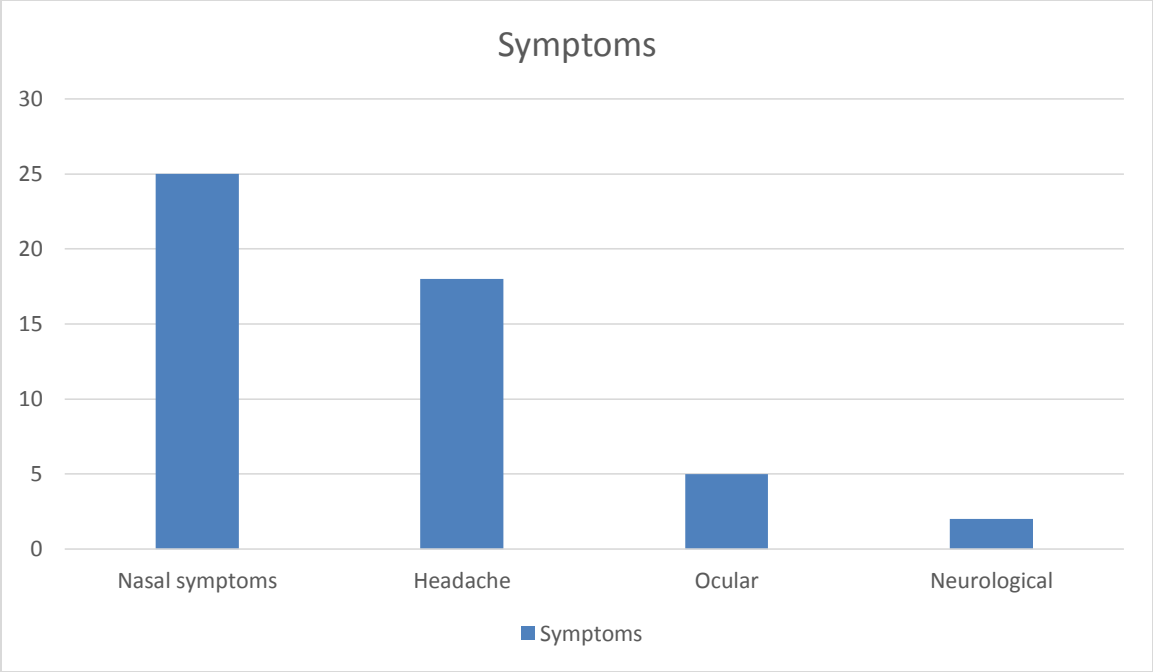
SEX

Number of cases in this study: 25



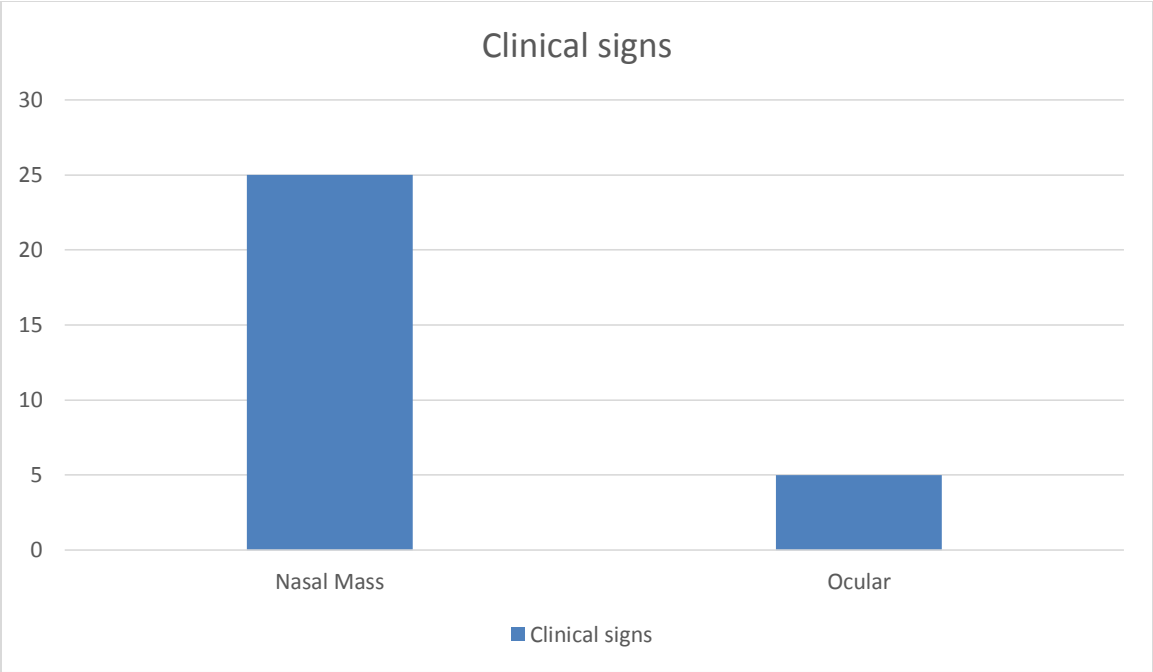
Clinical Symptoms

Number of cases in this study: 25

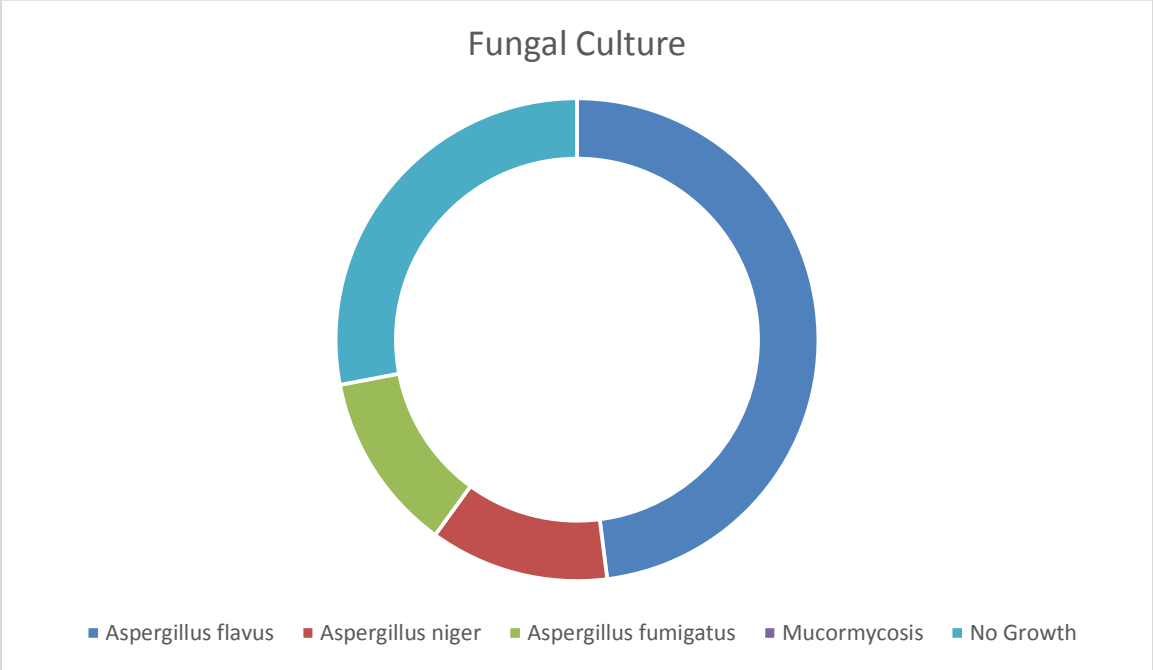


All the patients in our study had nasal symptoms (100%) They are nasal obstruction, nasal discharge post nasal discharge Frequent sneezing, reduced sense of smell (Hyposmia) or complete loss of smell (Anosmia) and nasal bleeding ocular symptoms like proptosis, epiphora, diplopia blurring of vision in our study was 20% In our study other symptoms were neurological 8%

Clinical Signs



Histopathology And Fungal Culture



Histopathology showed all cases were Aspergillus.

Ct Scan Of Nose And Sinuses

Sinus Involvement	No of patients	Percentage %
Maxillary Sinus	22	88
Ethmoidal Sinus	20	80
Frontal Sinus	13	52
Sphenoidal Sinus	11	44
All Sinuses	6	24
Orbital involvement	5	20
Intracranial Extention	2	8

Unilateral/Bilateral Comparison Study

Side of nose and sinus	No of patients	Percentage %
Right	1	4
Left	9	36
Unlateral	10	40
Bilateral	15	60

Surgical Procedures

A relevant surgical procedure was undertaken as per the extent of the disease and they are listed below.

Surgical Procedures	No of Patients	Percentage %
Endoscopic Sinus Surgery	19	76
Endoscopic assisted fronto-ethmoidectomy	5	20
Excision	1	4

Complications

By disease process

Complications	No of Patients	Percentage%
Orbital Complication- Total Opthalmoplegia, Orbital Cellulitis	5	20
Intracranial	2	8

Post operative Complications

Major complications	**No of patients**	**Percentage %**
Intra operative Hemorrhage	2	8
CSF leak	-	-
Pneumocephalus	-	-
Meningitis	-	-
Loss of vision	-	-
Diplopia	-	-
Nasolacrimal Duct Stenosis	-	-

Minor Complications	No of Patients	Percentage%
Adhesions	5	20
Epistaxis	2	8
Periorbital ecchymosis	2	8
Orbital fat prolapse	-	-
Loss of smell	-	-

Followup And Recurrence

No of cases	Months of follow up	No of recurrence
5 cases	18 months	2
15 cases	12 months	-
5 cases	6 months	-

Discussion:-

The fungal diseases of the nose and paranasal sinuses encompasses not one disease entity but includes an entire spectrum o different diseases. We have studied different disease causes namely allergic aspegillus sinusitis (25 cases). Although the treatment of these diseases is vastly different the presentation and clinical features are quite similar and thus they could be studied together. The authors have attempted to study these diseases under the common heading highlighting the important differences whenever required.

Age :The majority of cases in our study were between the age group of 21-40 years. They constituted 60% of the total number of cases. This was followed by the age group between 41-60 years and less than 20 years who constituted 40% total number of cases.

Sex: In our study there was a clear female preponderance, numbering 19 out of 25 cases (72%) and males 6 our of 25 cases (28%).

Symptoms: All the patients in our study had nasal symptoms The nasal symptoms included, nasal obstruction, nasal discharge frequent sneezing, reduced sense of smell (Hyposmia) complete loss of smell (Anosmia) and nasal bleeding. The next most common symptom was headache was seen in 72% of our patients. The next common symptoms was ocular symptoms such as epiphora, proptosis, diplopia and blurring of vision comprising about 20%
Signs: In our study, out of 25 patients, all 25 patients presented with nasal polyps, fungal mass (100%). The ocular signs such as proptosis diplopia and ophthalmoplegia was seen 20%

Histopathological Examination: A total of 25 different fungal disease have been reported in fungal sinusitis (Washburn et al)

Aspergillus, an ubiquitous fungus of the class Ascomycetes is the most commonly encountered fungus in the environment and is the most common species encountered in fungal sinusitis generally and presumably in allergic fungal sinusitis. The latter is largely based on histopathological findings of fungi with morphologic features similar to Aspergillus and not on the basis of culture documentation In our series 100% of fungal sinusitis were histopathologically proven to be aspergillus

CT Scan of Nose and Sinuses: All our patients in this series underwent CT scan preoperatively. MRI scan was not considered due to high cost factor and relatively low amount of extra information in cases of fungal diseases of the

nose and paranasal Sinus Manning et al., 1997 have reported that in T2 weighted MRI images there is a signal void corresponding to surgically proven areas of thick inspissated allergic mucin. Morning et al., also claim allergic fungal sinusitis is a distinct clinical entity with a highlyspecific radiographic appearance based on CT and MRI

Some cases demonstrated a starry sky pattern of material, which appeared to be calcium densities on bone windows. CT Scanning has been very useful in defining the full extent of the disease. Aspergillus sinusitis often has a mixture of high and low density areas within the sinuses. Bone windows allow a very accurate assessment of possible invasion.

Generally, only one series is involved with Aspergillus most commonly the maxillary sinus In our study maxillary sinus (88%) is the common involvement. Next Ethmoid 80% frontal sinus 52% sphenoid sinus 44%. All sinuses involvement 24%

Surgical Procedures: In our study, 19 cases were operated by Endoscopic sinus surgery. Endoscopic sinus surgery with less morbidity andmortality, clearance was to and recurrence rate is almost minimal in our study. In these study, 5 cases were operated by conventional surgery. Appreciable morbidity and external scar formation were possible in conventional surgery. It is a major surgical procedure and attended with major complications in conventional surgery. Even though in our cases we had no complications acquired in functional endoscopic sinus surgery only in 2 cases recurrence were noted. None of the patients developed complications and patients were discharged nextday itself. This correlates well with the previous study

We treated 30% our patients with steroids, both topically and systemically. The use of topical intranasal steroids is routine and we restrict the use of systemic steroids. It is our experience that the topical intranasal steriods alone when taken regularly is effective in preventing recurrence of the disease. However Allphin et al. feel that topical intra steroids are effective on after a course of oral corticosteroids

Antifungal agents were not used in any of our cases with allergic Aspergillus sinusitis. This view point is shared by many authors (Allphin et al., Klossek et al., Jonathan et al.,) who feel that the use of antifungal agents in the cases of allergic aspergillus sinusitis is unwarranted.

Complications: Complications of sinus surgery both endoscopic as well as external approach have been as major and minor according to the degree of morbidity and the treatment needed to prevent permanent serious sequlae

Complications seen in our study includes intraoperative haemorrhage in 2 cases (8%) and no cerebrospinal leak, Pneumocephalus and other reported major complications (Markmay et al., 1994) includes orbital hematoma, loss of vision diplopia, epiphora, meningitis, brain a and focal brain haemorrhage which were not seen in our study

Intracranial complications can be prevented by not disturbing the mucosa lying against the roof of the ethmoid sinus. It is also worth remembering that the vertical bony wall of the olfactory groove where the middle turbinate attaches to the roof of the ethmoid sinus may be extremely thin and should be avoided The authors feel that two other guidelines may help to prevent cerebrospinal fluid leaks. 1. Instrumentations or suction cannulas should be placed into the nose or sinuses only under endoscopic guidance. 2. The basal lamella should be entered at a point farthest from the roof of the ethmoids posteriorly and inferiorlyrather than anteriorly and superiorly

Intra operative haemorrhage serve enough to blood require transfusion is rare (Markmay et al.,) In our review none of them required blood transmission. The authors agree with other reported studies that this kind of peroperative bleeding is mostly from the interruption of the sphenopalatine artery as it courses over the face of the sphenoid sinus, just above the arch of the posterior nasal choanae. However the author do not agree with the suggestion of Markmay et al., who recommended the use of the suction and cautery for the control bleeding. In our experience the good combination of hypotensive anaesthesia and adequate packing will control the bleeding.

The most frequently encountered minor complication in our study 20% (5 cases). These adhesions are usually seen between the middle turbinate and septum or lateral wall of the nose Careful handling of the tissues during surgery, minimizes the chances of contact between the two adjacent raw surfaces Careful postoperative cleaning of the sinus cavity will also help in the prevention of adhesion. All the five patients in our study had a synechiae which were released in the outpatient department and there was no recurrences

Periorbital ecchymosis is the next minor complication and a total of 8%. These complications were seen after the endoscopic sinus surgery. This occurs usually due to violation of laminapapyraceaThe authors agreed with other reported studies that the violation of the lamina papyracea occurs most commonly with uncinectomy during endoscopic sinus surgery. All our patients who underwent external approach, usually have some amount of orbital edema which is a routine finding after this surgery and hence not considered by the authors as a complication. Follow up and recurrences: In this series 5 of our patients were followed up for a period of 18 months after surgery. 15 patients were followed up for a period of 12 months and another 5 patients followed up for a period of 6 months. We have not lost any patients during the follow up period All our patients are carefully counselled both preoperatively and post operatively on the importance of regular follow up treatment and proper medication. 2 recurrences were noted between 1 and 11/2 years. No recurrence was seen in the cases less than 1 year postoperatively.

Conclusion:-

This study on fungal diseases of the nose and paranasal sinuses was conducted at ENT Department, GovtRajaji Hospital, Madurai on 25 cases. out of these 25 cases all are Allergic Aspergillus sinusitis.

The most common age group with fungal diseases of the nose and paranasal sinuses was between 21-40 years of age. They constituted 60% of the total number of cases. There was a clear female preponderance with 72% and male cases constituted 28%.

All patients in this study had nasal symptoms. The other most common symptom was headache seen in of our cases 25 patients (100%) presented with a nasal mass either polyps or fungal mass. The ocular sign were seen in 20% of cases.

In our series of 25 cases, 25 (100%) histopathologically proven to be Allergic Aspergillus sinusitis. Fungal culture showed that Aspergillus flavus (48%), Aspergillus fumigatus (12%), and Aspergillus niger (12%), were culture positive and no mucormycosis present

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