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Clinical Findings of Ear, Nose and Throat Fungal Infections with their Mycological Aspect: A Cross-Sectional Study in Western India

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Abstract
The morbidity and mortality associated with these infections are becoming substantial and is emerging as a public health problem. Fungal infection is the 7th most common cause of infectious diseases. The aim of the present study was to investigate the Clinical findings of Ear, Nose and Throat Fungal Infections with their mycological aspect. Patients who attended the outpatient department of ENT specialty were screened for fungal infections and the patients who were affected for the first time were taken up for the study. After detailed history taking and thorough clinical examination, the patients were subjected to routine base line investigations of blood and urine. In appropriate cases special investigations like X-ray CT scan and Elisa test were done. For confirmation of the diagnosis the material was collected from the lesions and sent to departments of Microbiology and Pathology. The fungal material was sent to the laboratory in sterile bottles containing normal saline and biopsy material was fixed in 10% Formalin and sent histopathological examination. A total of 90 patients could be enrolled as the study- subjects. The mean age (SD) of them was (35.61±17.98) years ranging from below 8-90 years. Out of them, 62 (68.88%) presented with features of ear infection, 18 (20%) presented with throat infection and the remaining 10 (11.11%) with nose and paranasal sinus (PNS) infection. A. fumigatus was responsible for majority of nose and PNS infections while C. albicans was the commonest fungus responsible for fungal infection of the throat. It is more common in rainy and winter seasons when moisture content is high in the environment. Excessive use of antibiotic ear drops causes otomycosis. Mucor mycosis often occurs in patients with diabetic ketoacidosis.

INTRODUCTION

Diabetes mellitus is another common condition often associated with fungal infection[1,2]. The fungi those are capable of causing disease seem to do so because of their peculiar metabolism and possession of enzymes systems that give them ability to survive and grow at elevated body temperature at reduced oxidation and reduction environment of the tissues and the ability to overcome the host defense mechanisms[3]. Fungal diseases which were once considered as rare entities have increased in recent decades with the introduction of antimicrobial in 1945, corticosteroids in 1950, immunosuppressive therapy in 1960, organ transplantation in the 1960s, emergence of AIDS and increasing use of bone- marrow grafting in the 1980s. In addition, community-acquired fungal infections which encompass not only the opportunistic infections but also the endemic mycosis are also known. The morbidity and mortality associated with these infections are becoming substantial and is emerging as a public health problem. In the US, exclusive of those in HIV/AIDS patients, fungal infection is the 7th most common cause of infectious diseases. Despite the fact that our climatic condition may encourage fungal infection of middle ear, literature search reveals that not much work has been carried out on various aspects of fungal infection of middle ear. Keeping in view the high prevalence of fungal infection of middle ear in hot, humid and dusty areas, the study was carried out on clinical features, predisposing factors and fungal agents involved in particular region. The common fungal infection affecting the ENT areas are Candidiasis, Aspergillosis, Rhinosporidiosis, Mucor mycosis, Coccidioidomycosis, Paracoccidioidomycosis, Histoplasmosis and Blastomycosis. The diagnosis of the fungal infections involves X-ray, CT scan of the affected areas and laboratory identification of fungi. Some mycotic infections necessitate biopsy and histopathological examination of the involved tissues. Serological tests and skin testing with specific antigen are used in some fungal infections[4]. Treatment includes chemotherapy with antifungal drugs, surgical debridement of affected tissues and dealing with underlying cause.

MATERIALS AND METHODS

An observational cross-sectional study was done in which all the patients who attended to the Otorhinolaryngology Department of ENT during the period of 1 year with features suggestive of fungal infections were included. Patients suffering from malignancies and receiving radiotherapy or chemotherapy were excluded from the study. After obtaining consent from the patients, a detailed history was taken. During this period the new patients who attended the outpatient department of ENT specialty were screened for fungal infections and the patients who were affected for the first time were taken up for the study. After detailed history taking and thorough clinical examination, the patients were subjected to routine base line investigations of blood and urine. In appropriate cases special investigations like X-ray CT scan and Elisa test were done. For confirmation of the diagnosis the material was collected from the lesions and sent to departments of Microbiology and Pathology. The fungal material was sent to the laboratory in sterile bottles containing normal saline and biopsy material was fixed in 10% Formalin and sent histopathological examination. Swab/scrapping/biopsy was taken from relevant areas for microscopic examination of fungal flora and fungal culture. Histopathological examination (HPE) of the tissue from the relevant areas was also done. Data collected were analyzed and presented descriptively.

RESULTS AND DISCUSSIONS

During the period of two year a total of 867 patients have attended the ENT OPD. Of these 325 were new patients. Among them 185 were found to be suffering from infective diseases. Out of these 115 patients were clinically diagnosed as suffering from fungal infections. But only 90 patients were confirmed by laboratory investigations. A total of 90 patients could be enrolled as the study- subjects. The mean age (SD) of them was (35.61±17.98) years ranging from below 8-90 years. Out of them, 62 (68.88%) presented with features of ear infection, 18 (20%) presented with throat infection and the remaining 10 (11.11%) with nose and paranasal sinus (PNS) infection (Fig. 1). The main clinical findings at the different areas of involvement were debris in EAC and congested metal. skin in all ear cases, mass in nasal cavity in nose and PNS cases and curd-like plaque which on wiping left a raw or bleeding area in throat cases (Table 1). Age wise distributions of patients were shown in (Table 2, Fig. 2). Results of mycological investigations were shown in (Table 3).

The current study finding of fungal ear infections being highest in the age-group of 21-40 years (57%) correlates with the findings made by Kohli (1963) who found maximum incidence during the 2nd-4th decade of life. It is also comparable to study-findings made by Ence *et al.* that the mean age varied from 23-43 years[5]. Further, the current finding of fungal throat infections more in the old aged group of 61-70 years is in consistence with findings made by Bodey GP[6]. During the period of study of two year, the percentage of fungal infections was found to be 5.55%. Among 90 patients whose diagnosis was confirmed by investigations, the age group 21-40 yrs has highest incidence of 41.38%. Males are more commonly affected than females. This finding is in agreement with other studies in this field[2]. This can be explained

Table 1: Positive clinical findings

Clinical findings	No. of cases	Percentage
Ear cases		
Debris in EAC	62	100
Congested meatal skin	62	100
Congested TM	28	45.1
Conductive deafness	24	54.8
Perforated TM	8	13
Associated lesion of pinna	4	6.4
Nose and PNS cases		
Mass in nasal cavity	8	80
PNS tenderness	6	60
External swelling	5	50
Discrete black spots in nose	2	20
Throat cases		
Curd-like plaque	16	89
Red lesions on dorsum of tongue	2	11

Table.2: Age wise distribution of patients

Age Range	Frequency	Percentage
0-10	4	4.44
11-20	12	13.33
21-30	24	26.66
31-40	14	15.55
41-50	15	16.66
51-60	10	11.11
61-70	04	4.44
71-80	05	5.55
81-90	02	2.22
Total	90	100

Table 3: Results of Mycological Investigations

Method	+ve ear cases	+ve nose and PNS cases	+ve throat cases
KOH preparation	48 (77%)	8 (80%)	10 (56%)
Lactophenol cotblue preparation	42 (68%)	7 (70%)	8 (44%)

by the fact that young adult males are more active and move out of house in pursuit of livelihood and are exposed to fungal spores more often. The male predominance as seen from the present study was also in accordance with findings made by Kohli, Manning *et al.* and Vazquex *et al*.[7] Regarding the socio-economic background of the cases, very few people from the higher socio-economic group usually attends the study center. Hence, no definitive conclusion can be derived from the present study although majority of the fungal infections were seen among people of low to middle income groups. The incidence of fungal ear cases being more in the months of June to August is anticipated as high humidity, high rainfall and high temperature are known to precipitate fungal infections. The finding is in accordance with the findings made by Sree Rama Rao *et al.* from their study in Andhra Pradesh and by Joy *et al.* from their study in a Western Indian city[8]. The predominant presenting symptoms in fungal ear infection in the present study were itching, pain and blocked sensation. Ismail HK in 1962 found similar findings[9]. The main symptoms for nose and PNS cases as found out from the present study were nasal obstruction, epistaxis, headache etc. Shugar MA also found similar findings way back in 1987[10]. White patches on tongue and oral mucosa being the predominant symptomatology in throat infections as found from the current study were also comparable with findings already made by Vazquez *et al.* and Pankhurst C[11]. The HPE results seen in the present study are also in accordance with findings made by Shugar MA and Stammberger *et al*.[11,12] Again the fungal culture findings are in agreement with available literatures[9,11,13]. Similarly x-ray findings of nose and PNS were in agreement to findings made by Stammberger *et al.* and Hartwick *et al*.[12,14] In our study, CT scan revealed high density central mass in nasal cavity in 71% of nasal cases with areas of calcification in 29%. Som *et al.* also commented that on CT, fungal disease appears as high density central mass. They further added that calcification might be present in some cases[15].

CONCLUSION

The main findings were that otomycosis and aspergillosis of nose and PNS were more common in the 2nd-3rd decades of life whereas oral and oropharyngeal candidiasis was more common in older age-groups. In the overall, there was a male preponderance. Otomycosis which was mainly due to infection with A. niger had a definite relation with warm and humid climatic condition. A. fumigatus was responsible for majority of nose and PNS infections while C. albicans was the commonest fungus responsible for fungal infection of the throat. It is more common in rainy and winter seasons when moisture content is high in the environment. Excessive use of antibiotic ear drops causes otomycosis. Mucor mycosis often occurs in patients with diabetic ketoacidosis. Candidiasis most often occurs in patients with immuno-suppression. Rhinosporidiosis is significantly influenced by endemic factors.

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