Fungal Spectrum In Otomycosis At Tertiary Care Hospital

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Abstracts: Introduction: Otomycosis is a superficial mycotic infection of the external auditory canal that is caused by opportunistic fungi. It is a common fungal infection of the ear that is worldwide in distribution. The infection usually characterized by inflammation, pruritus, trauma to external auditory canal, scaling and severe discomfort such as suppuration and pain. We have tried to clarify the different causative factors & predisposing factors for otomycosis in our environment. Material & Methods: In this study we were including 100 patients (53 female and 47 male) with presumptive diagnosis of otomycosis. We performed mycological analysis on swab or fungal ball from external auditory canal of 100 patients. The diagnosis was confirmed micro biologically by direct microscopy (10% KOH mount) and fungal culture methods. Results: Otomycosis was more common among females as compared to males & also common in age groups of 20-35 yrs. The most common fungal pathogens isolated were *Aspergillus niger* (75.82%) followed by *Aspergillus fumigatus*(13.19 %), *Candida albicans* (7.69 %) & *Aspergillus flavus (3.3 %).* while bacterial co infection/ super infection was detected in 6 cases. Conclusion: In this study we observe that otomycosis is unilateral condition more common in young age housewives and farmers particularly during summer and rainy season. [Desai K et al NJIRM 2012; 3(5) : 58-61]

Key words: Otomycosis, *Aspergillus,* KOH mount

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Introduction: Otomycosis is an acute, subacute or chronic fungal infection of the pinna, the external auditory meatus and the ear canal. However the disease may occur in the middle ear in case of perforated tympanic membrane. The fungal agents responsible for this clinical entity are found as saprobes of the environment[1]. It is mainly produced by yeast & filamentous fungi that affects squamous epithelium of external auditory canal[2]. The commonest causative agent belongs to genus Aspergillus. The fungi are usually secondary invaders of the tissue rendered susceptible by bacterial infection, physical injury or corticosteroids therapy. The presenting symptoms include: scaling, pain, pruritus and erythematous, etc[1].

Approximately 5-25% of total cases of otitis externa are due to otomycosis[1]. It is more prevalent in warm & humid climate & among individuals of lower socio economic status with poor hygienic conditions[1].

Mixed infections are generally scarce as fungal flora tends to inhibit the bacterial growth. The flora found in external auditory canal is normal or commensal, made up of a series of micro organisms among which a great variety of bacteria is included – Staphylococcus epidermidis, Corynebacterium spp , Bacillus spp , Gram positive cocci (Staphylococcus aureus , Streptococci spp, non pathogenic Micrococci), mycelial fungi of Aspergillus genus or yeast like fungi particularly Candida spp[1,3,4] & Gram negative bacilli (Pseudomonas aeureginosa, E.coli, H.influenzae, Moraxella catarrhalis etc)[5]. The depth of external auditory canal cul de sac possesses many of the requirements necessary for fungal growth like humidity, temperature, substrate (protein & carbohydrate)[6]. This commensal flora is not pathogenic as long as balance between bacteria & fungi are maintained.

There are many predisposing factors of otomycosis like chronic infection of ear , use of oils, ear drops, excessive accumulation of cerumen, steroids, swimming (wetness predispose to fungal infection), fungal infection elsewhere in the body like dermatomycosis or vaginitis[1], immuno compromised state , malnourishment in children & hormonal changes precipitating flaring up of the infection as seen during pregnancy or menstruation[1,7,8]. All of the following factors have been consider to encourage infection like changes

in epithelial covering (dermatological disease , micro trauma), increase in PH(bathing), alteration of cerumen (bathing), systemic factors (alteration in immunity, debilitating disease, steroids, antibiotic, neoplasia), environmental factors (heat, excessive humidity), history of bacterial infection[7], CSOM(chronic secretory otitis media), instillation of oily substance in the ear & broad spectrum antibiotic therapy etc[8].

Materials and Methods: Study group: - Mycological analysis was carried out on swab, debris or fungal ball from external auditory canal of 100 patients during one year period which were clinically suspected of otomycosis. Data of this study was collected from patients both male & female attending OPD & Indoors of ENT department, Sir T General Hospital, Bhavnagar. Sample receiving & processing was done in Microbiology Laboratory, Sir T General Hospital, Bhavnagar.

Collection of samples: - Samples were collected from external auditory canal of patients with the help of sterile cotton swab.

Laboratory Diagnosis: - Direct microscopic examinations of obtained specimens were carried out for detection of fungal elements. For this we were using – KOH (10%) & Gram's stain. Culture: - Samples were inoculated on Sabouraud's Dextrose Agar (SDA) with antibiotic (Gentamicin & Penicillin) & incubated at 25° c & 37° c for a minimum period of 4 weeks. Culture bottles were examined for presence of growth every 3-4 days[1].

Identification: - Direct microscopic examination from culture growth by using Lactophenol Cotton Blue (LPCB) mount preparation & Gram's stain[1]. Slide culture examination used for differentiation of morphology and detection of Chlamydospore formation on Corn meal agar[1].

Results: Patients of age from 5- 70 years taken into consideration. Maximum numbers of patients were between 20-35 yrs of age groups and majority of them were belong to low socio economic conditions and with poor personal hygiene. Incidence of otomycosis was more among 51 Females (56%) & as compared to 40 Males (44%). In this study the incidence of otomyosis was 100% unilateral. As far as the side of ear is concerned no any difference was found. Out of 100 cases 42 were housewives, 32 were farmers & 26 were labourers. In present study the incidence of otomycosis was high among housewives (44%), incidence among farmers (34%) & labourers (22%). The present study was conducted from August 2009 to July 2010 which includes duration of 12 months. In this study majority of cases were obtained during April to November this period includes summer and rainy season. There was no presence of wax in external auditory canal with otomycosis suggesting probable role of cerumen in preventing otomycosis.

Fungal species

	No. of cases	%
Aspergillus niger	69	75.82%
Aspergillus fumigates	12	13.19%
Aspergillus flavus	03	3.3%
Candida albican	07	7.69%

In present study , the swab material cultured on SDA showed that 69 cases were caused by Aspergillus niger(75.82%), 12 cases were caused by Aspergillus fumigates(13.19%), 03 cases were caused by Aspergillus flavus (3.3%)& 07 cases were caused by Candida albican(7.69%).

Correlation between KOH preparation & Culture

	KOH positive	KOH negative	Total
Culture positive	85	6	91
Culture negative	3	6	9
	88	12	100

P value < 0.0005 – Highly significant

Discussion: 91% patients were proven to be suffering with otomycosis. In this group 85 cases were smear & culture positive, where as 6 cases were smear negative but culture positive for fungal elements. 3 samples did not show growth on

media, althougth positive for presence of fungal elements on direct smear examination, probably because of stringent requirement of fungi for some essential nutrient. Correlation between smear examination & culture isolation of fungal elements was highly significant. Incidence of otomycosis were common among age groups of 20-35 years[1,8]. According to K Murat Ozcan et al[3] & Paulose et al[6] 31-60 year age group as suffering the most & they attribute it probably to religious practice of head covering as a predisposing factors which is mandatory in Turkey.

Incidence was more common among females[8], because of most of females were housewives have a lot of working in damp, cold condition of house & field's lead to exposure to dust & deposion of fungal spores. On the contrarily Paulose et al[6] & CP Baweja et al[9] found that incidence was more among males. This is may be because of including of male workers in study who works in hot & dusty environment. Occupational incidence mainly involves farmers, because of unhygienic practice of self cleaning of ear canal with dirty fingers, hair pins, match sticks hastens the deeper invasion of fungus[8].

Otomycosis is commonly one sided disease & the present study is proof of this fact. 100% cases had otomycosis in a single ear. Paulose et al[6] & Jawad Ahmed et al[8] who also reported that otomycosis is predominantly a unilateral disease in percentage of 85% & 90% respectively. In both study incidence of otomycosis in both ears was 15% & 10% respectively. As far as the side of ear is concerned studies could not find any differences.

Majority of cases were reported between April to November that constitutes summer & rainy season[5,8]. Fungi in soil or in sand which contains decomposing vegetable matter, dropping of cattle, goats & other domestic animals. This is desiccated rapidly in sunlight & dispersed as wind blown particles. The airborne fungal spores are carried on droplets of water vapour a fact which correlate with the high incidence during summer & rainy season. Excessive sweating during summer dilutes wax & reduces the protective sleeve property. High humidity gives suitable condition for fungi. The relative high humidity & temperature in external auditory canal which approximate that of the body are the prime factors[5].

In present study all the cases had no cerumen in external auditory canal[6,8]. Ear wax contains numerous amino acids, saturated & unsaturated fatty acids which have an inhibitory effect on fungi. However these remains controversial till date that cerumen may support luxurious growth of Aspergillus species despite containing the above contents[10].

The most common isolated species was Aspergillus niger (75.82%), followed by Aspergillus fumigatus (13.19%), Candida albican (7.69%) & Aspergillus flavus (3.3%). Sood VP et al[5], Paulose KO et al[6] & Jagdish Chander et al[11] isolated predominantly Aspergillus niger from cases were 60%, 55% & 57.5% respectively. Because Aspergillus niger grows on cerumen, epithelial scales & debris deep in the external auditory canal & resulting in plug of mycelium. Other commonly isolated fungal species were Aspergillus fumigatus, Aspergillus flavus & Candida[8,9,11]. Some have reported other organism as causative isolates such as Penicillium spp & other species of Candida such as C. parapsilosis & C. gulliermondi with varying percentage of isolation[8]. This is because of geographic pattern of fungus in different places.

Conclusion: Moist environment, poor hygiene, in India and climate condition is conductive for growth of fungi. The present study suggested that otomycosis found predominantly unilateral more common in young age group, in female mainly housewives & farmers and Aspergillus niger is one of the most common causative organism implicated in causation of otomycosis. In present study we also noticed that the patients were reported with poor personal hygiene belonging to low socio economic conditions. Microscopic smear examination cannot be taken as evidence of negativity for fungal presence & has to be confirmed with culture investigation of the specimen. Bacterial co-infections are present in few numbers of cases co-existing with the fungal

flora. Predisposition to otomycosis & subsequent relapse is clearly connected to individual predisposing factors localized in external auditory canal & with indiscriminate use of topical antibiotic. Treatment of otomycosis is mandatory to prevent recurrence.

References:

1. Dr Jagdish Chander , Textbook of Medical Mycology , New Delhi: Mehta Publishers , April 2002
2. R Ananthanarayan and CKJ Paniker, Textbook of microbiology, 5th Edition, Orientlongman, 562
3. K Murat Ozcan, Muge Ozcan, Aydin Karaarslan, Filiz Karaarslan, Otomycosis in turkey; predisposing factors, aetiology & therapy. The J Laryngol Otol, 2003; 117: 39-42
4. Joy MJ, Agrawal MK, Samanth HC, et al. Mycological & Bacterial studies in Otomycosis, Ind J Otolaryngol, 1980; 32: 72-5
5. Sood VP, Sinha A, Mohapatra LN. Otomycosis : A clinical entity- clinical & experimental study, J Laryngol Otol, 1967; 81: 997-1004
6. Paulose KO, AL Khalifa S, Shenoy P, Sharma RK. Mycotic infection of the ear (Otomycosis) : A prospective study, J Laryngol Otol , 1989; 103: 30-5
7. Pahwa VK, Chamiyal PC, Suri PN. Mycological study in Otomycosis. Ind J Med Res, 1983; 77: 334-8
8. Jawad Ahmed NA, Ashok S Nayak, A clinicopathological study of Otomycosis , JJM Medical College, Davangere, Karnataka, 2006
9. CP Baveja, Dhingra PL & Natarajan R. Mycological profile in Otomycosis & it's response to an Anti-fungal agent. Indian J Laryngol & Otology, 1993; 224-225
10. Akobjanoff & Senturia BH. The chemistry of cerumen- A preliminary report. J Invest Dermatol 1954; 23: 43-49
11. Jagdish Chander, Sangeeta Maini, Subha Subrahmanyam & Aru Handa. A clinico mycological study & efficacy of mercurochrome in its treatment, Govt Med College, Chandigadh. Mycopathologia, 1996; 135: 9-12

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