

**A CLINICAL AND MICROBIAL STUDY OF OTOMYCOSIS: AN ORIGINAL STUDY**Prakash S. B<sup>1</sup>, Leelatejaswini R. M<sup>2</sup>, Deekshita V<sup>3</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT:** Otomycosis or "Otitis externa myotica" refers to a fungal or yeast infection of the external auditory meatus. Fungi can be isolated in up to 40 percent of all cases of external otitis, especially "Aspergillus niger and Candida albicans". It has a worldwide distribution with higher prevalence in the hot, humid and dusty climate of the tropical and subtropical regions and sometimes in association with immunosuppression and poor hygienic conditions. The purpose of this study is to analyse the etiology, clinical manifestations, microbial pattern of otomycosis and treatment.

**KEYWORDS:** Otomycosis, Otitis Externa Zyotica, Aspergillus Niger.

**INTRODUCTION:** otomycosis or "otitis externa myotica" refers to a fungal or yeast infection of the external auditory meatus. Fungi can be isolated in upto 40 percent of all cases of external otitis, especially Aspergillus niger, A. flavus and Candida albicans". Commonly associated bacteriae are staphylococci, pseudomonas and dermatophytes. Saprophytic fungi may grow under special environmental conditions, in the normal ear but can be found frequently when there is a chronic bacterial infection, foreign body, necrotising otitis externa or tumour in the external ear. It is predominantly seen in hot and humid climatic conditions.

These saprophytic fungi may become pathogenic under certain conditions such as immunosuppression or the overuse of steroids or antibiotic containing drops. Fungal infection may also be seen in case of history of trauma, swimmers, diabetes mellitus and also chronic suppurative otitis media and open mastoid cavity infection.

A predominance of males over females of about 1.5:1 is observed with highest incidence between 25 and 50 years. Both ears are equally affected. These patients present with ear ache, itching in the ear, fullness of the ear and discharge from the ear. Majority of these patients are associated with diabetes mellitus. The sequelea of this is hearing impairment, and secondary bacterial infection. Aural swab is analysed for the causative fungal organism and treatment is given accordingly. Treatment includes topical ear drops constituting antifungal agents namely clotrimazole and miconazole.

**MATERIALS AND METHODS:** 100 patients were randomly selected from the dept. of ENT over the period of 15months. History of each patient of each patient was taken with regard to age, sex, religion, occupation, socioeconomic status, complaints, history of presenting complaints, family history, past history and personal history and all the details were entered in the proforma sheet.

Next the patient was subjected to thorough general physical examination and the local ENT examination. Collection of materials for microbiological investigations was done by taking 3 sterile swabs, first of which was used to clear the outer most part of the canal and this swab was always discarded. The other two swabs were used to collect samples from the deeper part of the meatus and were used for direct smear examination and culture.

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For direct microscopy, a drop of 10% KOH aqueous solution (a keratolytic agent consisting of 10gms of potassium hydroxide, 10ml glycerine, distilled water 80ml mixed together and stored at room temperature) was used. Then further Gram's staining was done for identification of fungal elements.

For fungal culture SABOURAUD'S DEXTROSE AGAR MEDIA was used and the fungus was identified by the preparation of LACPHENOL-BLUE SOLUTION in MICROSLIDE culture. The pathological material was inoculated in a zig-zag manner on the SBD media and kept in incubator at 20 degree Celsius, and observed every alternated day for rate of fungal growth, general morphology of colony texture, surface pigmentation up to 6 weeks.

Micro slide culture enables the study of the arrangement of mycelium and spores at various stages during the course of growth without disturbing their natural arrangement and helps in species identification. Methods of treatment were by instillation of antifungal drops and by use of cotton wick or ribbon gauze impregnated with antifungal solution/cream. The following anti-fungal pharmacological agents were used randomly in treatment:

1. CLOTRIMAZOLE SOLUTION.
2. MICONAZOLE SOLUTION.
3. SILVER SULPHADIAZINE OINTMENT.

These modes of treatment were used for 7 days/3 weeks/4 weeks/6 weeks of duration. Follow up of patients were done daily for 3 days, on alternate days up to 2 weeks and once in 4 days up to 4 weeks.

### RESULTS:

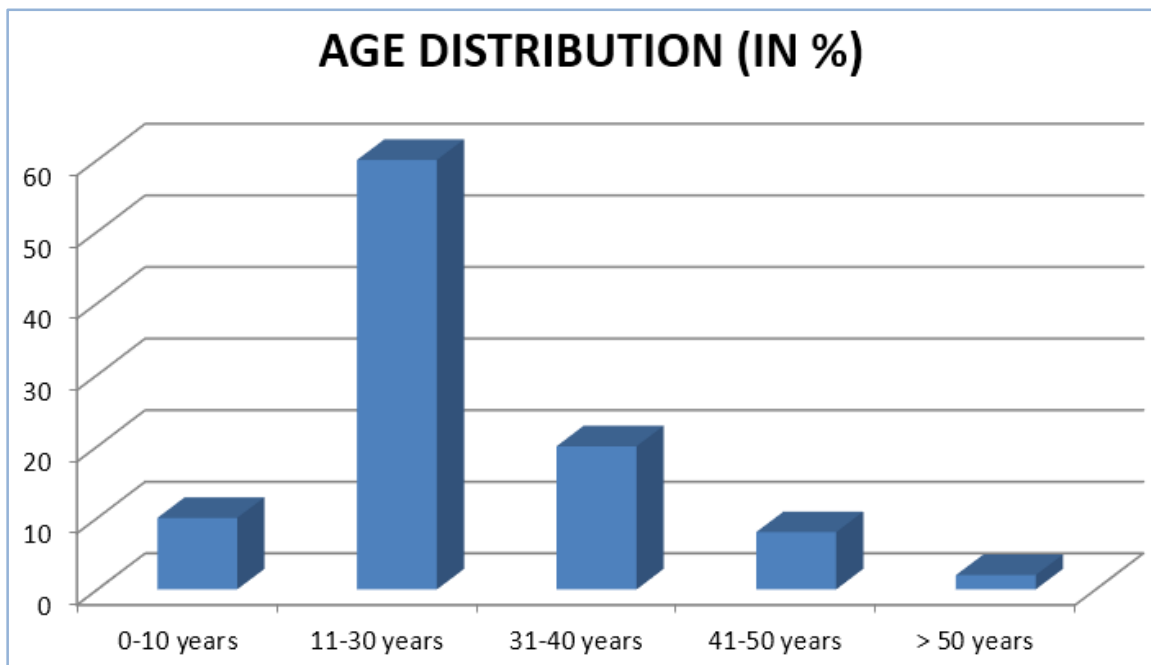


Fig. 1

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Age	Present Study	Paulose et al 1989	Mamatha ballal et al 1987	Mohanty J.C et al 1998
1-10 years	10%	12.90%	8.99%	-
11-30 years	60%	55%	-	50%
31-40 years	20%	22.79%	-	30%
41-50 years	8%	5.69%	-	16%
>51 years	2%	3.62%	-	4%

Table 1: Age Distribution in Comparison with Other Studies

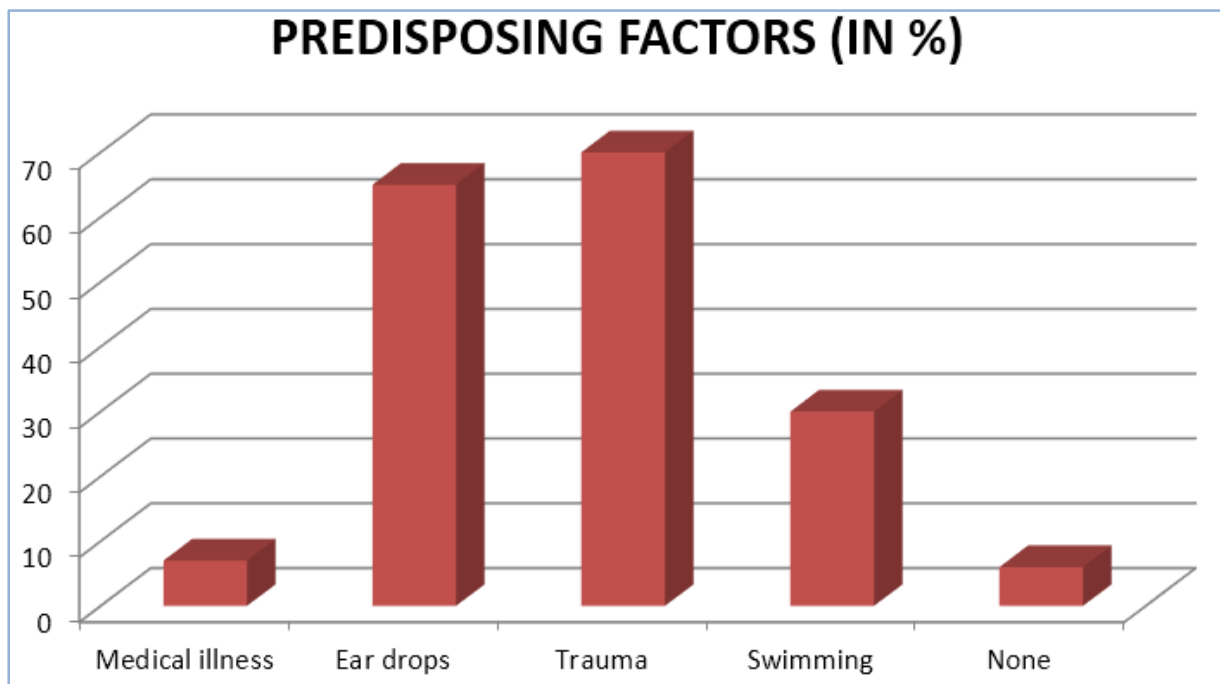
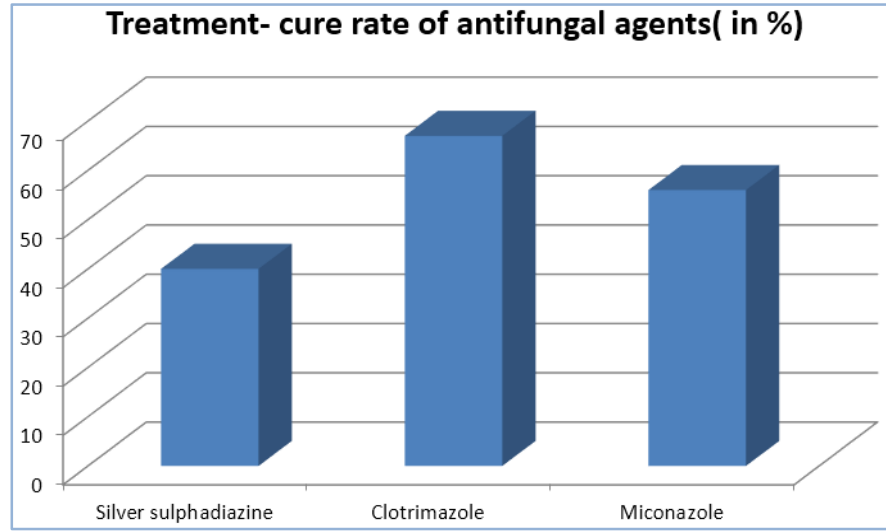


Fig. 2

	Present Study	Sheikh et al 1993	S.K Jaiswal et al 1990	Mohanty J.C et al 1998
Trauma	70%	-	60%	75.9%
Ear drops	65%	41%	-	79.6%
Swimming	30%	42%	-	-

Table 2: Predisposing Factors in Comparison With Other Studies

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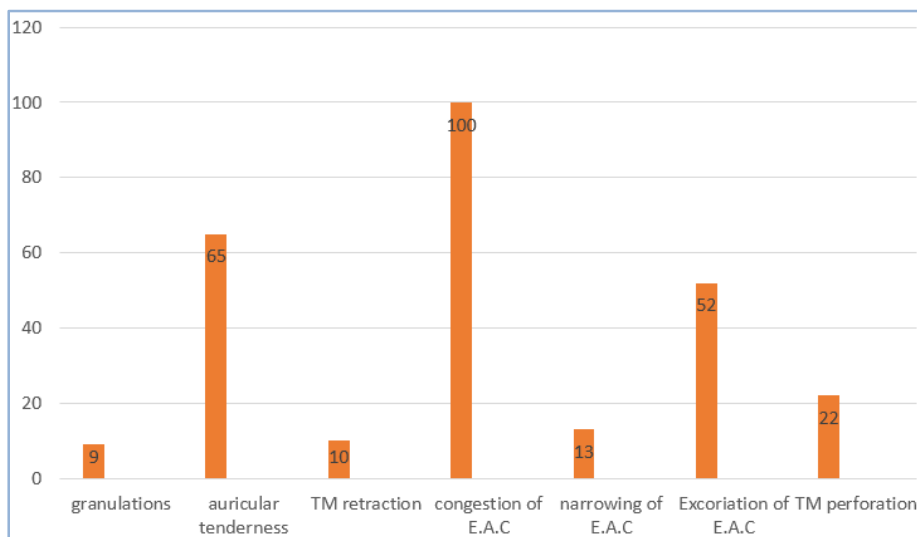


**Fig. 3**

Table Showing the Results of Antifungal Agents Used in the Treatment of Otomycosis in the Present Study

Antifungal Agents	No. of Cases Treated	Cure Rate	% Improved	% No Response	% No Follow up	Impression
Clotrimazole	60	66.7%	16.60%	8.30%	8.30%	Markedly Effective
Miconazole	25	56%	20%	12%	12%	Moderately Effective
Silver sulphadiazine	15	40%	20%	13.32%	26.64%	Moderately Effective

**Table 3: Treatment Given in Comparison with Other Studies**



**Fig. 4: Graph Showing Otoscopic Findings (In %)**

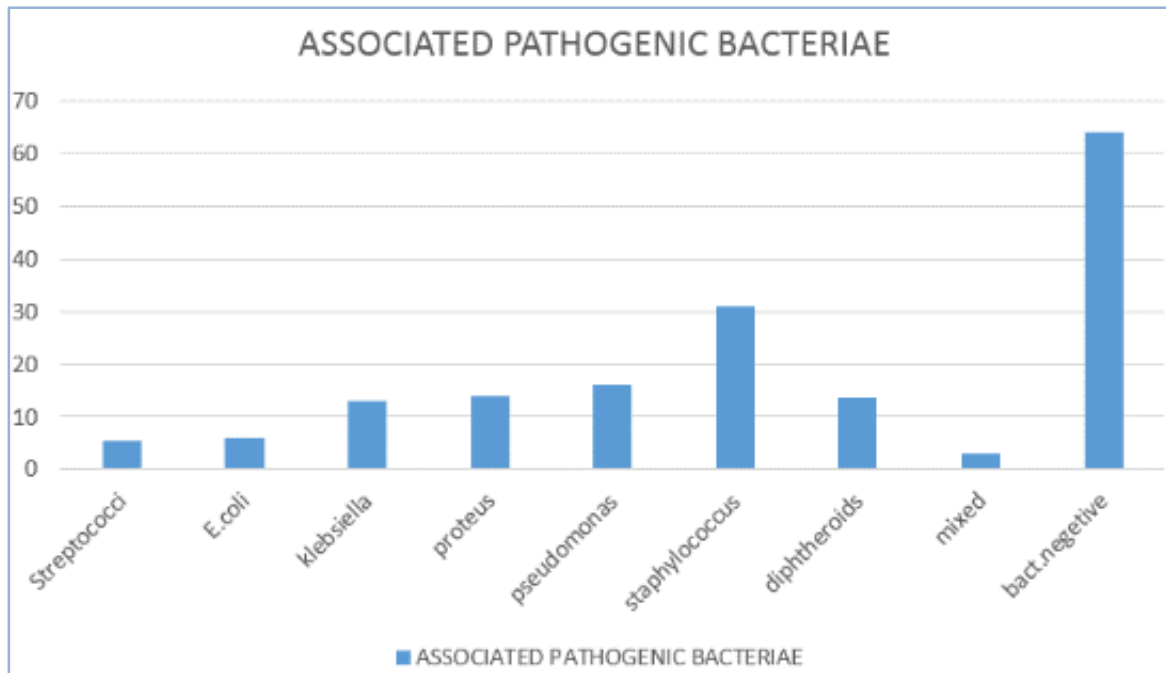


Fig. 5: Associated Pathogenic Bacteria

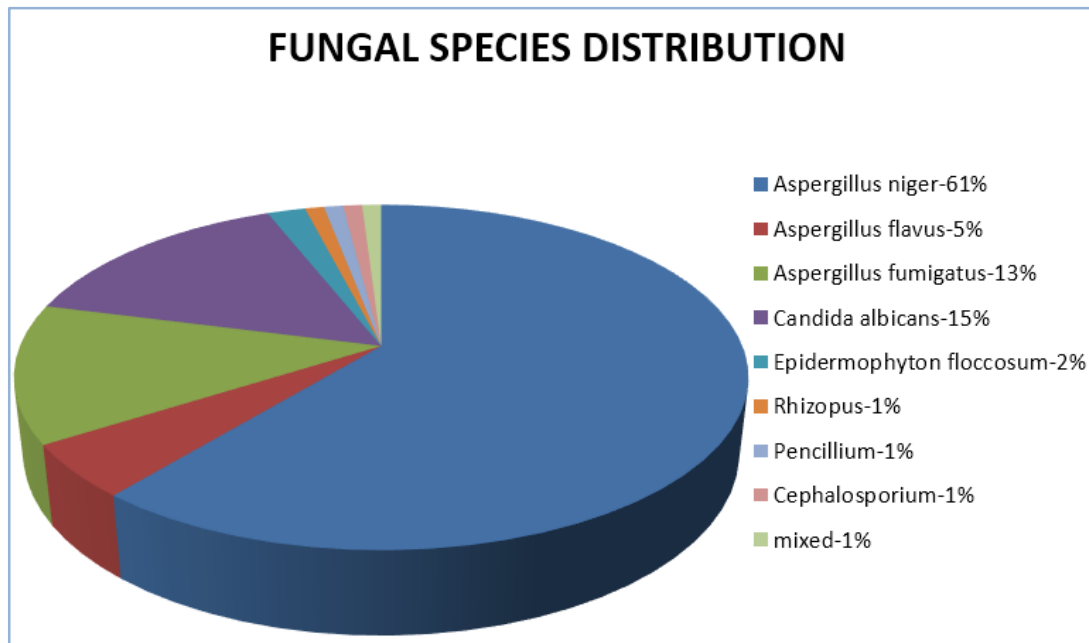
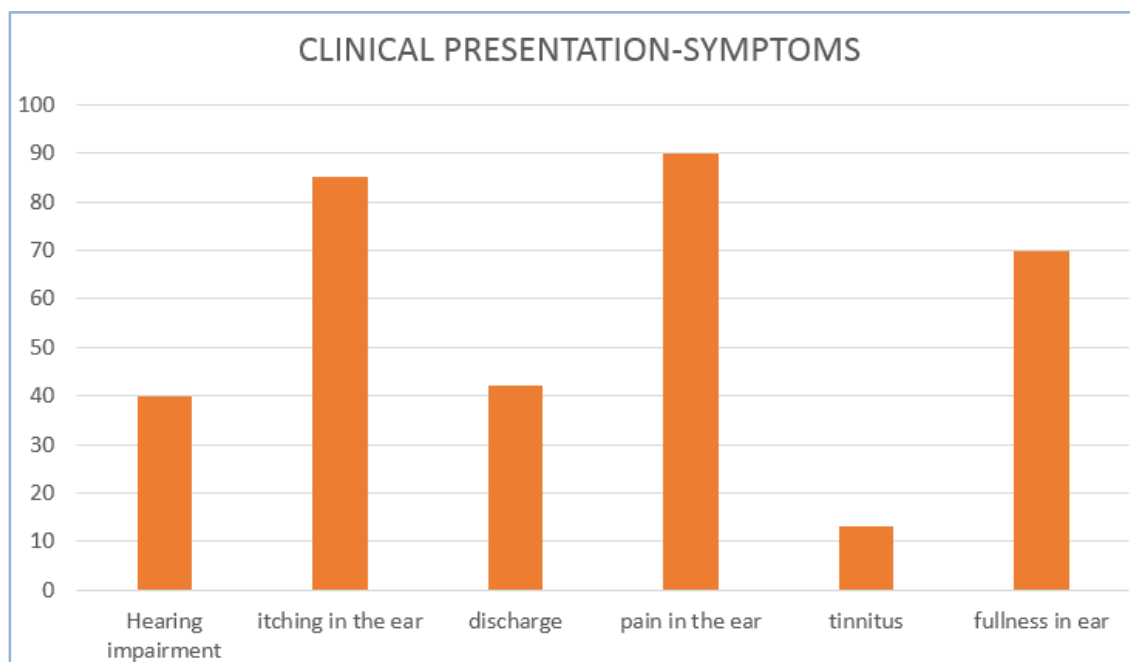


Fig. 6: Showing Fungal Species Distribution



**Fig. 7: Showing Clinical Presentation Symptoms**

**DISCUSSION:** Our study indicates that maximum number of cases of otomycosis occurred in the age group between 11 to 30 years. The incidence of fungal infection was comparatively less in the age group below 10 years and in the age group above 50 years. The disease was predominant in persons engaged in agricultural work, outdoor work, more prone to take bath in ponds and tanks in rural areas. In urban areas, patients of this age group worked in busy market areas where the chances of dust and dirt entering the external auditory meatus and subsequent scratching and trauma. According to Yassin, Mostafa and Moawd (1964): 82.46 percent were adults; children and elderly aged group were 8.77 percent respectively.<sup>1</sup>

The incidence of otomycosis was found to be more in males as they are more exposed to dust which may lead to deposition of fungal spores. In a study conducted by Mohanty J.C Mohanty S.K. et al (1998), the incidence in male patients was 74 percent. But there was another study done by Yehia and Al Habib in the year 1990 and in it they showed major incidence of otomycosis among females.<sup>2</sup>

The present study showed that otomycosis is common in lower socio-economic group (61%) followed by middle income group (36%), higher income group (3%). These findings were compared with the studies of S .K. Jaiswal (1990): lower income group (60%), middle income group (40%), higher income group (nil).<sup>3</sup>

40% of the patients were agriculturists, 19% were labourers, 15% were house wives, 3% of cases were office employees, 2% of cases were students, 2% cases were business class in the present study. These findings can be compared with study of S.K. Jaiswal (1990): 40% of cases were farmers, 40% were labourers, 6% were housewives, 4% were office employees, 4% were students, 6% were business class. In the present study majority of cases (81%) of otomycosis reported during April and December months. This observation can be compared with the studies of Muglistan and G.O. Donoghue (1985), Paulose et al (1989), Jaiswal (1990), Sheik et al (1993), Kulkarni et al (1994).

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They are all of the opinion that otomycosis is more prevalent during hot, humid season. The period between April to December are the summer and rainy months of Mysore. The excessive sweating during the summer months leads to the dilution of the ear wax and reduces its protective sleeve property. The pH of the E.A.C is shifted to alkaline side. All these factors favours the growth of fungi.<sup>4</sup>

In the present study 90% of patients had otomycosis in a single ear and only 10% had the disease in both the ears. Otomycosis is more commonly present in the left ear (66%) in the present study.

The predisposing factors of otomycosis is trauma to E.A.C (70%) and the indiscriminate use of ear drops (65%) followed by swimming (30%), and other associated conditions (7%). In the present study, the nature of trauma to E.A.C is in the form of in advertent use of matchsticks, hair pins, safety pins, commercially available swabs, finger nails, poorly maintained mastoid cavities. The indiscriminate use of ear drops as a predisposing factor is 65% in the present study. Increased use of antibiotic-steroid drops, systemic and local steroid usage.

Increased moisture provides good environment for growth of fungi. In diabetes mellitus patients increased levels of glucose in the tissue may favour the growth of fungi in the E.A.C. in A.I.D.S patients decrease in the general and local immunity causes rapid and extensive invasion of the fungus in the deeper tissues (Munoz. A et al 1997). The incidence of swimming as predisposing factor of otomycosis in the present study is 30%.<sup>5</sup>

In the present study 90% of patients presented with pain in the ear, 85% with itching, 70% with feeling of fullness or blocking of the ear, 42% with discharge from the ear, 40% with impaired hearing, 13% with tinnitus. The irresistible urge to scratch the ear canal with the fingertip or any sharp instruments like hair pins facilitates subepidermal invasion of fungi.<sup>6</sup> In present study, in 90% of cases the wax was significantly absent. Cerumen has fungicidal property.<sup>7</sup>

In the present study the most common mycological picture was the presence of FUNGAL BALL, black mycotic plug/blotting paper like mass/wet newspaper like mass in 52 cases, greyish white material in the external auditory canal in 23 cases, yellowish coloured crusts/debris 5 cases, dry mat like appearance in 8 cases, and the other is mucopurulent discharge in 29 cases.<sup>8</sup>

After adequate aural toilet all 100% cases showed congestion of the skin E.A.C. 52% of cases showed excoriation of EAC. 13% of cases showed narrowing of the EAC.22%of cases showed perforation of tempanic membrane as sequelae of CSOM .10% of cases showed retracted TM, 9% of cases had granulation in EAC. Auricular tenderness could be elicited in 65% of cases. In the present study tympanic membrane perforation and granulations were 22 and 9% respectively.<sup>8</sup>

It was observed that otitis externa was associated in 72% of otomycosis cases<sup>9</sup>. Regarding the fungal species distribution *Aspergillus* species was found in 79% of cases, *Aniger*-61%, *A. fumigatus* -13%, *A. flavus* -5%.The next predominant species was *candida albicans* -15%. Baruah and Agarwal (1972) found that *Aspergillus* was the most common fungus found in their studies of CSOM cases.<sup>10</sup>

The present study revealed that 36% cases were associated with pathogenic bacteriae and 64% cases were bacteriologically negative. *Staphylococcus aureus* accounted for 31%, *staphylococcus Albus* accounted for 3%, *Pseudomonas*- 16%, *proteus*- 14%, *klebsiella*-13%, *E.coli*-6%, *Streptococci*-6%, *Diphtheriodes*-13.5%, mixed-3% of the bacteriologically positive cases.<sup>2,3,6</sup>

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**TREATMENT:** Clotrimazole topical ear drops were used in 60 patients. 40 patients (67%) were cured, 10 patients (17%) showed improvement, 5 patients (8%) did not improve, 5 patients (8%) did not come for follow up. According to Jordon c stern et al. (1988), clotrimazole was effective against 75% of fungi. Clotrimazole had the greatest zone of inhibition (>22mm) and also has broad spectrum of activity against fungi<sup>2,3</sup>.

Miconazole ear drops were also used as treatment in 25 patients of which 14 patients (56%) got cured, 5 patients (20%) showed improvement, 3 patients (12%) did not respond, 3 patients did not come for follow up. Miconazole had 19-22mm fungal growth inhibition in culture studies<sup>6</sup>.

Silver sulphadiazine (1%) ointment was used in 15 patients. 6 patients (40%) got cured, 3 cases (20%) improved, 2 cases (13.32%) did not respond, 4 cases 26.46% did not come for follow up.

It was also observed that silver sulphadiazine showed a marked degree of zone of fungal growth inhibition >22mm<sup>11,12</sup>.

**CONCLUSION:** In the present study entitled “A clinical and microbial study of otomycosis” was carried out on 100 otomycosis cases in the department of ENT Krishna Ragendra hospital, Mysore medical college, Mysore.

### OTOMYCOSIS:

- Was found to be common in males in the age group between 11 -30 yrs.
- Incidence was predominant during April to December months.
- Predominantly unilateral in nature.
- Occupational incidence was more common among agriculturist and labourers.
- Trauma to EAC, indiscriminate use of antibiotic steroid ear drops and swimming are all predisposing factors.
- Most common presenting complaint was pain in the ear followed by feeling of fullness or blocked sensation in the ear.
- The most common otoscopic findings were the presence of wet newspaper like blackish fungal debris and congestion in the EAC.
- *Aspergillus Niger* was the most common fungal pathogen isolated.
- Meticulous cleaning of the EAC by dry mopping, suction clearance and otomicroscopic suction clearance and instillation of antifungal and antibiotic ear drops was the mainstay of treatment.
- The most effective topical antifungal agent was clotrimazole eardrops followed by Miconazole ear drops, silver sulphadiazine ointment.

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