

OTOMYCOSIS–MYCOLOGICAL SPECTRUM AETIO-PATHOLOGICAL FACTORS AND MANAGEMENT

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ABSTRACT: Otomycosis is a fungal infection of External auditory canal. Otomycosis has worldwide distribution with high prevalence in hot, humid and dusty climates of tropical and subtropical regions. Management of Otomycosis is dependent on thorough understanding of anatomy of external ear canal, knowledge of microbiology and pathophysiology of potential pathogens. **OBJECTIVES:** To determine importance of various aetio-pathological factors in causation of Otomycosis. To study pattern of fungal isolates encountered in cases of Otomycosis. To study management of the disease. **MATERIALS AND METHODS:** This study was undertaken in the Department of Otorhinolaryngology, Sri Siddhartha Medical College & Hospital, Tumkur from January 2012 to December 2012. It was a time bound study, wherein 51 cases were studied. **OBSERVATION AND RESULTS:** Highest incidence (25.5%) was noted in age group of 21-30 years. Common predisposing factor was use of unsterile material for cleaning ear in 55.3% cases. Fungal debris within canal in form of wet brownish black or grey mouldy mats/ spores with epithelial debris was found in 53.2% cases. Aspergillus was most common fungus isolated in 81%. Clotrimazole showed good response symptomatically and mycological clearance was seen within one week in 74.4% cases and persistence of disease up to 2 - 4 weeks was seen in 25.5% cases. On follow up failure or recurrence disease within 2 months was observed in 10.6% of cases. **CONCLUSION:** In conclusion Otomycosis/mycotic otitis externa is still a common problem and is often misdiagnosed for other chronic otitis conditions.

KEYWORDS: Otomycosis; otitis externa.

INTRODUCTION: Otomycosis, also known as Fungal Otitis Externa, is a fungal infection of the External auditory canal (EAC). It is commonly encountered and challenging problem in the otolaryngology clinics, because of the need for long term treatment and follow up.

Since the first recorded article on "Otitis Externa" written by Meyer in 1844, fungal infections have been considered to be of major importance. In 1952, Gill stated that fungal infections were more prevalent than generally recognized and made a plea for careful examination.

Over 100, 000 species of fungi have been described, but only 100 are recognized as pathogens. Most fungal species that are pathogenic for humans, cause opportunistic infections and only dermatophytes are transmissible from host to host.

Otomycosis has a worldwide distribution with a high prevalence in the hot, humid and dusty climates of tropical and subtropical regions. The incidence in such climate has increased and many authors have attributed it to be due to increasing use of antibiotics, immunosuppressive and various aural preparations and bad aural hygiene factors.

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Otomycosis is not highly infectious but has a tendency to be confused with other chronic otitic conditions, unless manifested in a classical way, they tend to be misdiagnosed.

Management of otomycosis is dependent on thorough understanding of anatomy of the external ear canal, knowledge of microbiology and patho-physiology of potential pathogens and familiarity with various clinical presentations, so that an accurate and early diagnosis can be made and appropriate treatment initiated.

The present study was thus designed with the view to know the mycological pattern encountered in otomycosis along with aetio-pathological factors and its management.

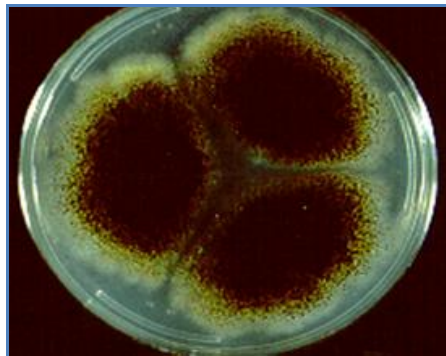
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OBJECTIVES:

1. To determine the importance of various aetio-pathological factors in causation of otomycosis.
2. To study the pattern of fungal isolates encountered in cases of otomycosis.
3. To study the management of the disease.

ASPERGILLUS NIGER:

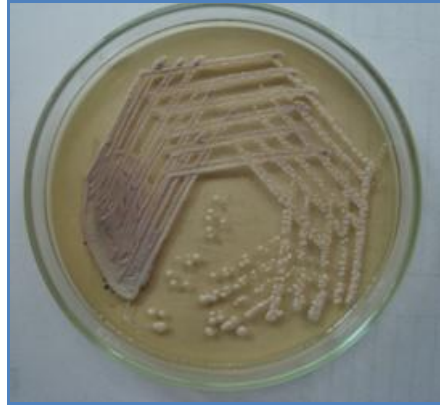


A. NIGER COLONY ON SABOURAD'S DEXTROSE AGAR

ASPERGILLUS FLAVUS:



A. FLAVUS COLONY ON SABOURAD'S DEXTROSE AGAR

CANDIDA ALBICAN:**CANDIDA ALBICAN COLONY ON SABOURAD'S DEXTROSE AGAR****MATERIALS AND METHODS:**

SOURCE OF DATA: The present study was undertaken in the Department of Otorhinolaryngology, Sri Siddhartha Medical College & Hospital, Tumkur from January 2012 to December 2012. It was a time bound study, wherein 51 cases were studied.

METHOD OF COLLECTION OF DATA: A detailed clinical history was recorded. After clinical diagnosis of otomycosis was made, all the cases were subjected to mycological examination by taking two aural swabs or otomycotic debris whenever possible. One swab for wet mount preparation in 10% KOH solution. The second swab was directly inoculated into Sabourad's dextrose agar medium. After taking the swabs, external auditory canal wall was cleaned by microscopic suction and then treated with topical antifungal agent (1% clotrimazole) and later followed up for a minimum of one week to 2 months for noting the clearance or recurrence of the disease. Any side effect of the topical antifungal agent – clotrimazole was recorded. In the present study, the cases with positive fungal isolates on cultures were included and negative fungal isolates were excluded.

All patients diagnosed as otomycosis clinically and mycologically were included. Patients on topical antifungal agents and negative fungal culture were excluded.

Data was analyzed by using descriptive statistics.

OBSERVATION AND RESULTS: A total of 51, clinically diagnosed cases of otomycosis were seen from January 2012 to December 2012, of which only 47 cases produced positive fungal isolates. This constituted 92.1% cases, which were taken up for study.

AGE DISTRIBUTION: In this study, the highest incidence was noted in the age group of 21-30 years (25.5%), followed by 31-40 and 41-50 years age group (each 21.2%). The least incidence was observed in the age group of 0-10 years (2.2%).

In the present study youngest patient noted was 9 years and the eldest was 68 years old. Mean age was 38.2 ± 14.1 years.

SEX DISTRIBUTION: The study showed slightly higher incidence of otomycosis in females (53.2%) than in males (46.8%).

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LATERALITY DISTRIBUTION: In this study otomycosis was found to be unilateral in 44 cases (93.6%) and bilateral in 3 cases (6.4%)

PREDISPOSING FACTORS	FREQUENCY	PERCENTAGE (%)
Cleaning with unsterile material	26	55.3
Eardrops	24	51.1
Water entering the EAC	18	42.5
COM	10	21.3
Head cloth	10	21.3
Previous Surgery	04	8.5
PREDISPOSING FACTORS		

In this study, the most common predisposing factor was use of unsterile material for cleaning the ear (Buds, match sticks, hairpins, pencils etc.) in 55.3% of cases, followed by use of ear drops (antibiotic or steroids) in 51.1% cases, water entering the ear canal in 42.5% of cases, use of head cloth in 21.3% of cases and previous ear surgery in 8.5% of cases.

SEASONAL INCIDENCE	FREQUENCY	PERCENTAGE (%)
Rainy(June-Sept)	22	47
Summer(Feb-May)	15	32
Winter(Oct-Jan)	10	21
Total	47	100
SEASONAL INCIDENCE		

In this study, the highest number of cases were seen in rainy season i.e. from June to September (47%), followed by summer i.e. from February to May (32%). The least number of cases were seen in winter season i.e. from October to January (21%).

CLINICAL PRESENTATION OF OTOMYCOSIS: It was observed that itching in the ear was the most common symptom in 44 cases (93.6%), followed by pain in the ear in 40 cases (85.1%), feeling of blocked sensation in 39 cases (82.9%) and ear discharge in 7cases (14.8%). The other symptoms were tinnitus and reduced hearing in 14 cases (29.7%).

MYCOLOGICAL APPEARANCE	FREQUENCY	PERCENTAGE
Wet brownish black or grey mouldy mats/ spores with epithelial debris	25	53.2
Dry blackish mouldy mats with spores	13	27.7
Soft caseous material/ mats with epithelial debris	5	10.6
Wet blotting paper mats with epithelial debris	4	8.5
Total	47	100
MYCOLOGICAL APPEARANCE IN THE INFECTED EAR CANAL		

In the present study, fungal debris within the canal in the form of wet brownish black or grey mouldy mats/ spores with epithelial debris was found in 53.2% of cases, dry blackish mouldy mats with spores in 27.7% of cases, soft caseous material/ mats with epithelial debris in 10.6% of cases and 8.5% cases had wet blotting paper appearance on otoscopic examination.

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INFLAMMATORY SIGNS IN OTOMYCOSIS: In this study, hyperemia of the canal skin was the most common inflammatory sign observed in 41 cases (87.23%), followed by edema of the canal in 24 cases (51.20%) and granulation tissue in 08 cases (17.02%).

FUNGAL CULTURE	FREQUENCY	PERCERTAGE
Aspergillus Niger	28	59.5
Aspergillus Flavus	06	13.0
Candida Albicans	05	10.6
Aspergillus Fumigatus	04	8.5
Candida Globrata	01	2.1
Mixed	03	6.3

FUNGAL ISOLATES ENCOUNTERED IN OTOMYCOSIS

Aspergillus was the most common fungus isolated in 38 cases (81%) of which 59.5% were Aspergillus niger, 13% were Aspergillus flavus and 8.5% were Aspergillus fumigatus. The next commonest fungus isolated was Candida in 6 cases (12.7%) of which 10.6% were candida albican and 2.1% were candida globrata. Mixed growth was found in 3 cases(6.3%).

TOPICAL ANTIFUNGAL DRUG	No. of CASES	SYMPTOMATIC & MYCOLOGICAL CLEARANCE WITHIN 1 WEEK		PERSISTENCE OF DISEASE UP TO 2-4 WEEKS		FAILURE OR RECURRENCE OF DISEASE WITHIN 2 MONTHS	
		NO	%	NO	%	NO	%
Clotrimazole	47	35	74.4	12	25.5	05	10.6

RESULTS OF TOPICAL ANTIFUNGAL AGENT IN TREATING OTOMYCOSIS

Clotrimazole showed good response symptomatically and mycological clearance was seen within one week in 74.4% cases and persistence of disease up to 2–4 weeks was seen in 25.5% cases. On follow up failure or recurrence disease within 2 months was observed in 10.6% of cases.

SIDE EFFECTS OF TOPICAL ANTIFUNGAL AGENT: It was seen in the present study that majority (89%) of the cases, did not had any side effect due to topical application of Clotrimazole ear drop, only 11% had burning sensation after instilling of the ear drops.

DISCUSSION: Otomycosis is an entity frequently encountered by otolaryngologists and can usually be diagnosed by clinical and laboratory examination. Otomycotic are infections frequent in tropical countries, because of humidity and heat.

Out of 51 clinically diagnosed cases of mycotic otitis externa, only 47 were positive for fungal isolates and were included in the study. These constituted 92.15% fungal isolation.

AUTHOR	YEAR	TOTAL No. of CASES WITH CLINICAL DIAGNOSIS	CASES WITH POSITIVE FUNGAL ISOLATES	
			NUMBER	PERCENTAGE
Gokale SK et al ¹	2013	103	88	85.43
Pradhan B et al ²	2003	107	87	81.30
Yehia MM et al ³	1990	219	179	81.74
Paulose KO et al ⁴	1989	193	171	88.60

The present study correlates with the study carried out by Gokale SK et al¹, Pradhan B et al², Yehia MM et al³ and Paulose KO et al⁴.

PREDISPOSING FACTORS FOR MYCOTIC OTITIS EXTERNA: In the present study it was observed that majority (55.3%) of the cases used unsterile material like safety pins, hairpins, matchsticks, pens, sticks or swabs for cleaning the ear, followed by use of topical antibiotics/ steroids in 51.1% of cases.

Water entering the ear while taking bath, swimming or by syringing for wax removal (42.5% of cases), COM (21.2% cases), use of customary head cover or turbans (21.2% of cases) and previous ear surgery (8.5% cases) were the other predisposing factors noted.

These findings are similar with the observations made in study done by Mohanty JC et al⁵, where use of unsterile swabs and sticks for cleaning the ear was found in 75.9% as a common predisposing factor.

Similarly, in the study done by Xianhao Jia et al⁶ and Satish H.S et al⁷ also showed cleaning with an unsterile material as a commonest predisposing factor. Also in a study done by Mohanty JC et al⁵, showed widespread use of topical antibiotic preparation (79.6%) as commonest predisposing factor, while in the present study it was seen only in 51.1% of cases. This is due to the fact that most of the patients used unsterile material or unsterile oil or mixture of oils as homemade remedy for topical use to get relieve from any ear symptoms. The use of topical agents and unsterile oil change the physiochemical environment in the ear canal and thus favor a condition in the ear canal for fungal growth and colonization, trauma to ear by sticks further aids in colonization of fungus.

The present study showed that in 21.2% of the cases using traditional head cover or turbans had otomycosis which does not correlate with the study done by Paulose KO et al⁴, where 63% of the cases using customary head cloths of various kinds did not suffer from otomycosis. These findings do not correlate with another study done by Chander J et al⁸ where 52.25% of male patients used turbans before onset of symptoms. This could be explained that the other factors played a major role as predisposing factor than the use of head covers or turbans.

Recurrent otomycosis was observed in 4.6% of post- mastoidectomy cases in a study done by Pradhan et al², which correlates with the present study were previous surgery accounts for 8.5%.

SEASONAL INCIDENCE: In the present study, it was observed that the average incidence of otomycosis per month was 11.7% in rainy season (June-September) followed by 7.9% in summer season (October-January). In the winter season (February-May), the average cases were least with 5.3% cases per month.

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Mohanty JC et al⁵ and Muglistan T et al⁹ in their studies observed otomycosis to be more prevalent in warm and humid climate particularly in rainy season than in arid or cold climates and thus correlates with the present study.

The higher environmental humidity favors otomycosis because of the high humidity and temperature in the external auditory canal which approximates the body temperature, which in turn favors growth of dormant spores of fungi lying in the canal. The presence of high humidity shifts the pH of external auditory canal to alkaline side. This further helps in the growth of fungi.

FUNGAL ISOLATES ENCOUNTERED IN MYCOTIC OTITIS EXTERNA: In the present study *Aspergillus* was the commonest fungus isolated in 80.85% cases of otomycosis, of which *Aspergillus niger* was the commonest species isolated in 59.5% followed by *Aspergillus flavus* in 12.76% and *Aspergillus fumigatus* in 8.51% of cases. *Candida* was the next common fungi isolated in 12.76%, of which *Candida albicans* was found in 10.6% and *Candida glabrata* in 2.1%. Mixed growth was found in 6.3% of cases.

In the studies done by Gokale SK et al¹, Paulose KO et al⁴, Mohanty JC et al⁵, XianhaoJia et al⁶, and Chander J et al⁸ had *Aspergilli* as the commonest fungus isolate followed by *Candida*, which correlates with the present study. Whereas Garica MP et al¹⁰ had *Candida* as the commonest isolated fungi followed by *Aspergillus* species.

But the species variation as reported in different studies can be due to the geographical pattern of fungus at different places.

Aspergillus species has been isolated from the air and house dust. Beany and Broughton found that *Aspergillus* species produce antibiotics, which eliminate bacterial competitors. This could also be attributed to the fact that *Aspergillus* is commoner than *Candida* in the isolates.

This observation shows that the fungi infecting the ear canal are mainly saprophytes, which thrive in hot and humid climate and on dead and desquamated epithelial cells of ear canal, which are the characteristic requirements for the saprophytic fungal growth.

MANAGEMENT OF MYCOTIC OTITIS EXTERNA: In the present study, fungal and epithelial debris from the infected ear canal were removed under microscope by suction, after clinical diagnosis was made.

After cleaning the fungal and epithelial debris from the ear canal, topical antifungal agents – 1% Clotrimazole was used in the form of ear drops. Patients were followed at the end of 1 week to 2 months, to assess the efficacy of treatment. Efficacy were ascertained by disappearance of itching, pain, and discharge from ear as well as clearance of masses of white, grey or black debris invading the external auditory meatus and side effects of drug were recorded.

Results showed that clotrimazole was effective in 35 cases (74.4%), at the end of one week of treatment showing both symptomatic and mycological clearance of the disease. On further follow-up it was observed that 42 cases (89.4%) showed symptomatic and mycological clearance of the disease at the end of 2-8 weeks and 5 cases (10.6%) had recurrence or failure within 2 month.

During follow-up, the side effects of topical clotrimazole, seen were very minimal. Only 10.07% complained of mild burning sensation after instillation of eardrops which persisted for few minutes.

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The study done by Paulose KO et al⁴, Mohanty JC et al⁵, Chander J et al⁸ and Hurst WB et al¹¹ had followed thorough cleaning of ear meticulously before initiation of treatment and was comparable to the present study in which removal of the fungus and epithelial debris in the ear canal was done, followed by use of antifungal agent.

Studies by Paulose KO et al⁴, Hurst WB et al¹¹, and Bassiouny et al¹² have emphasized the effectiveness of clotrimazole and absence of ototoxicity. Bassiouny et al¹² studied the effects of antifungal agents and found that clotrimazole and econazole were effective antifungal agents in the treatment of otomycosis.

In the study done by Paulose KO et al⁴ and Hurst WB et al¹¹, it was observed that Clotrimazole was effective for the management of otomycosis with minimal side effects and are comparable with the present study on effectiveness of clotrimazole.

In the study done by Paulose KO et al⁴, it was seen that local irritation and burning sensation was found in very few cases after installation of clotrimazole ear drops and was well tolerable antifungal agents in majority of the cases and correlates to the present study.

Our study has again proved that regular aural suction toilet along with topical broad spectrum antifungal agent like clotrimazole is very effective in treatment of otomycosis. However it was observed that it requires patient compliance and regular follow-up for prolonged period of 4 - 8 weeks to achieve complete cure in cases of Otomycosis, along with elimination of predisposing factor.

CONCLUSION: In conclusion otomycosis/mycotic otitis externa is still a common problem and is often misdiagnosed for other chronic otitis conditions. No age act as barrier or sex gives immunity to this disease and is usually a unilateral disorder. Cleaning of external auditory canal with unsterile material and use of topical antibiotic/steroid ear drops were the commonest predisposing factors. Itching and pain in the ear were the commonest symptoms.

Wet brownish or black grey mouldy mats/ with spores with epithelial debris were the commonest characteristic finding on otoscopy along with hyperemia and edema of the external auditory canal. The fungus isolated were Aspergilli and candida and are to be considered as predominant fungus for otomycosis as these saprophytic fungi thrive on exfoliated dead epithelial cells along with humid environment in external auditory canal.

Thorough and meticulous cleaning of the fungal and epithelial debris from the ear followed by topical antifungal agent is of paramount importance in management of this condition, along with elimination of predisposing factors. Clotrimazole is effective, safe and well tolerated topical antifungal agent.

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