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Otomycosis, frequency, clinical features, predisposing factors and treatment implications

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ABSTRACT

Background: The aim of this study was to determine the frequency of otomycosis, the clinical presentation, predisposing factors and treatment outcome.

Methods: This observational study was conducted at ENT Department of Basaveshwara Medical College and Hospital, Research centre, Chitradurga from May 2018 to June 2019, 13 months study. There were 50 patients with documented diagnosis of otomycosis. There were 19 (38%) males and 31 (62%) females. The age of patients ranged from 3 years to 65 years with mean age of 32.5 years. Mean follow-up time was 1 year (~13 months). The frequency, predisposing factors and most common symptoms of otomycosis were recorded along with the response to different Antifungal agents were observed and results were recorded in percentages. Data were analysed using SPSS 12 software. Results are based on descriptive statistics.

Results: We prescribed 1% clotrimazole drops or lotion in 58% of patients and 2% salicylic acid in 31% cases. Both of these agents are effective. Topical 1% clotrimazole drops yielded highest resolution rate with lowest recurrent rate. To analyse the efficacy of 1% clotrimazole and 2% salicylic acid. We applied Z-test to calculate the difference between two proportions of patients before treatment with those patients who remained uncured after treatment.

Conclusions: Otomycosis commonly prevented with hearing loss, pruritus, otalgia and otorrhoea. It usually resolves with local toilet of ear and installation of antifungal agents.

Keywords: Antifungal, Clotrimazole, Salicylic acid

INTRODUCTION

Otomycosis is a common condition encountered and its prevalence in this study is 7% among patients who presented with signs and symptoms of otitis externa. It is almost in accordance with other studies.¹

It is a pathologic entity, with *Candida* and *Aspergillus*, the most common fungal species.²

It is not clear that the fungi are the true infective agents or more colonization species as a result of compromised local host immunity secondary to bacterial infection.³

We conducted this study with the aim to determine the frequency, clinical features, predisposing factors and outcome of different treatment modalities.

METHODS

It was observational study conducted over 1 year from May 2018 to June 2019 in ENT Department of Basaveshwara Medical College and Hospital, Research Centre, Chitradurga. Patients were prospectively recruited via non-probability convenience sampling. It composed of 50 patients of both genders and all age groups with documented diagnosis of otomycosis.

Statistical analysis

Data were analysed using SPSS 12 software. Microsoft Excel and Microsoft Word (version 8.1) were used to generate the tables. Results are based on descriptive statistics. We applied Z-Test to calculate the difference between 2 proportions of patients suffering from symptoms of disease before starting treatment with those patients who remained uncured after completing the treatment.

Data was collected regarding presenting frequency of the disease, response to different treatment regimens, common symptoms, history of prior otological procedures, treatment outcomes and follow-up duration.

To analyse the efficiency of 2% salicylic acid and 1% clotrimazole, we applied Z-Test to calculate the difference between 2 proportions of patients suffering from symptoms of disease before starting treatment with those patients who remained uncured after completing the treatment. The diagnosis of otomycosis was made on the basis of the recognizable and characteristic appearance of fungal debris and fruiting bodies under microscopy.

Cultures are not routinely obtained because there is generally a rapid response to treatment in most of the cases. The treatment was offered to most of the patients are as follow.

Clotrimazole 1% lotion or cream or drops were used after cleaning the canal with the use of microscopy and gauze impregnated in clotrimazole cream. Most of the cases settled in one week. The treatment was continued for 3 weeks in resistant cases. Prior treatment included ototopical or oral preparations received before presentation. Successful treatment outcome was defined as resolution of all evidence of fungal infection on physical examination. Residual disease was defined as a condition that failed to respond to my initial choice of treatment. Recurrent disease was defined as "recalcitrant otomycosis" as a condition that occurred in patients who had resolution of disease after initial treatment but recurred in the same ear at a later date.

RESULTS

A total of 50 patients with documented diagnosis of otomycosis were included in the analysis. The group consisted of 19 (38%) males and 31 (62%) females. The age at diagnosis ranged from 3 years to 65 years with a mean age of 32.5 years. Mean follow-up time was 1 year, bilateral disease was observed in 20 (40%) patients on initial presentation. The presenting complaints at the time of diagnosis are tabulated in Table 1. As shown, hearing loss and pruritus were the most common symptoms at the time of diagnosis, followed by otalgia, otorrhoea or tinnitus. Local examination findings that suggest otomycosis include a thick fibrous accumulation of debris like cotton-wool appearance or wet-blotting paper

appearance, small well-circumscribed areas of granulation tissue within the external canal or on the tympanic membrane and watery discharge. Treatment received before diagnosis is listed in Table 2.

Table 1: Symptoms at the time of diagnosis.

S. no.	Symptoms	No. of patients	%
1.	Hearing loss	38	76
2.	Pruritus	34	68
3.	Otalgia	20	40
4.	Otorrhoea	16	32
5.	Tinnitus	3	6

Table 2: Therapeutic agents.

S. no.	Therapeutic agents	No. of patients	%
1.	Ototopical antibiotic drops	31	62
2.	Analgesic	37	74
3.	Antihistamine	32	64
4.	Sytemic antibiotic	25	50
5.	Soda glycerine E/D	22	44

Table 3: Treatment agents.

S. no.	Treatment agents	No. of patients	%
1.	Clotrimazole lotion or cream 1%	29	58
2.	2% salicylic acid	15	30
3.	Ototopical drops	6	12
4.	Antimicrobials	13	26
5.	Fluconazole	2	4
6.	Nilstat oral drops	11	22

The duration of treatment ranged from days to months. Nearly 62% of patients have been using ototopical ciprofloxacin, antibiotic drops, like neomycin, polymyxin-B, hydrocortisone and oral antimicrobial for treatment of presumed otitis media before diagnosis. Disease complications included serous otitis media in 15 patients (30%), tympanic membrane perforation in 8 patients (16%) and external auditory canal (EAC) osteitis in 3 patients (6%). Tympanic membrane perforations were considered complications of otomycosis if they were present during initial presentation and healed with resolution of infection or if they were observed to occur during the course of treatment of the 3 (6%) patients with osteitis, 2 (4%) patients had a known history of diabetes mellitus. Among all subjects, diabetes was a documented co-morbidity in 3 (6%) patients, though this is not significantly different from the reported prevalence of diabetes in the general population. The most common therapeutic options used in my practice are listed in Table

The therapeutic agents were always used in conjunction with thorough mechanical debridement of visible fungal

elements in the EAC. 1% clotrimazole lotion/ cream and 2% salicylic acid appeared to be effective but 1% clotrimazole is slightly more effective. Treatment duration ranged from 1-8 weeks. Overall, 43 (86%) patients improved with initial treatment. 7 (14%) patients were lost to follow-up after initiation of treatment, 9 (18%) failed initial treatment. Among the 43 patients that responded to initial treatment, 18 (36%) patients had recurrent disease. The efficacies of the two most common treatment modalities are shown in Table 4.

Table 4: Efficacy of different treatment modalities.

	1% clotrimazole		2% salicylic acid	
	No. of patients (n=29)	%	No. of patients (n=15)	%
Resolution	24	48	13	26
Residual disease	6	12	2	4
Recurrent disease	14	28	4	8



Figure 1: Examination on otoscope: otomycosis.

To analyse the efficiency of 2% salicylic acid and 1% clotrimazole, we applied Z-test to calculate the different between 2 proportions of patients suffering from symptoms of disease before starting treatment with those patients who remained uncured after completing the treatment. The Z-values were calculated which were away from critical region. We draw the conclusion that the difference between two proportions is significant. We tested the two treatment modalities and the result of statistical tests show that both treatment regimens are effective but 2% clotrimazole is slightly more effective.

There are 4 cases of documented EAC dermatitis as a result of local irritation from clotrimazole otic solution. Culture results were available for 10 patients 2 of

Aspergillus niger and 5 of Aspergillus flavus and 3 for Candida species. 8 (16%) patients had history of otologic procedure in the affected ear that ranged from grommet insertion (myringotomy) to tympanomastoidectomy. 4 (8%) patients had canal wall down procedures that resulted in a mastoid cavity. These patients were treated with topical 1% clotrimazole lotion. Residual fungal disease after initial treatment was seen in one patient and one had recurrent disease.

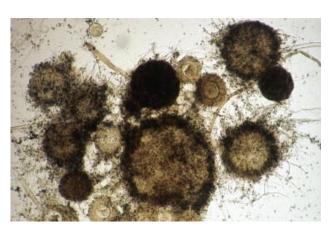


Figure 2: Histology 100X: otomycotic debris (Aspergillus niger).

DISCUSSION

In our study, most of all isolated species were Aspergillus and Candida when compared to sudy of Meirtusovas et al, they examined 550 samples from the external ear, 40% was mycologically positive with most of common infectious agent of otomycosis was *Aspergillus* species.⁴ However, other etiologic agents include *Allescheria boydii*, *Scopulariopsis*, *Rhizopus*, and *Absidia*.⁴

The incidence of otomycosis in our study was high in the age group of 21-30 years (34%) followed by 11-20 years (23.4%). This may be due the fact that immune-compromised states are less common in younger age group according to Mahmoudabadi et al.⁵

Occurrence of otomycosis was high in our study (58%) when compared to the studies conducted by Ho et al.⁶ The occurrence of bilateral otomycosis is very low. In our study only unilateral involvement was found. Ho et al observed a bilateral involvement in 7% of the patients.⁶

In our study there were 19 (38%) males and 31 (62%) females. The age of patients ranged from 3 years to 65 years with mean age of 32.5 years. Similar findings were reported in a study conducted by Ford et al.⁷

The mycosis results in inflammation, superficial epithelial masses of debris containing hyphae, suppuration and pain. In addition, symptoms of hearing loss and aural fullness are results of accumulation of fungal debris in the canal. Pruritus has been frequently

cited as one of the hallmark symptoms upto 93% in a study of Sterm et al.⁸

However, males were predominantly affected in the study conducted by Pradhan et al⁹.

Tympanic membrane (TM) perforation and serous otitis media are not uncommon with otomycosis and tend to resolve with treatment. The pathophysiology of the TM perforation may be attributed to avascular necrosis of the TM as a result of mycotic thrombosis in the adjacent blood vessels. The rate of 20% (8 patients) of TM perforation in this series is similar to that observed by Pradhan et al.⁹

It was reported among the chief complaints in 30 (60%) of the current study population. *Aspergillus* and *Candida* species are the most commonly identified fungal pathogens in otomycosis according to study of Sood et al and Youssef et al. ^{10,11}

Infections with *Candida* can be more difficult to detect clinically because of its lack of a characteristic appearance like *Aspergillus* and can present as otorrhoea not responding to aural antimicrobials according to Youssef et al.¹²

Otomycosis attributed to candida is often identified by culture data. Although multiple in-vitro studies have examined the efficacy of various antifungal agents, there is no consensus on the most effective agents as compared with study of Sterm et al.¹³

Various agents have also been used clinically with variable rate of success according to study of Kurnatowski et al and Paulose et al. 14,15

Nevertheless, application of appropriate topical antifungal agents coupled with frequent mechanical debridement usually results in prompt resolution of symptoms, although recurrent or residual disease can be common. In this series more than 70% of the patients had resolution of the infection with initial treatment, often in less than two weeks. Topical clotrimazole is my preferred antifungal agents for its efficacy against both aspergillus and candida species. There were only 2 (4%) cases of local sensitivity to clotrimazole and the infection seems to resolve faster and display a lower recurrent rate.

There were no clinical features predictive of TM perforation. TM involvement is likely a consequence of fungal inoculation in most medial aspects of the external canal or direct extension of the disease from adjacent skin.

There appear to be little consensus with respect to the predisposing factors for otomycosis. For instance, the presence of cerumen has been speculated to be supportive of fungal growth by some, yet inhibitory by others.^{8,15}

There have also been reports of autoinoculation of ear canal that result in otomycosis by patient with untreated dermatomycosis. More recently there has been increasing concern with respect to increasing incidence of otomycosis from wide spread use of fluoroquinolone otic drops.¹⁶

A. flavus was found to be the second most common causative agent followed by Aspergillus fumigatus. However, Kaur et al reported, A. fumigatus as the common causative agent of otomycosis followed by A. niger.¹⁷

Most common symptoms of otomycosis are pruritis, hearing loss, ear discharge and ear pain. This is in agreement with the other studies. 9,18

In our study, *A. niger* was the most commonly isolated organism. This is in accordance with the other studies. ^{19,20}

Aspergillus species and Candida species are the most commonly identified fungal pathogens in otomycosis.²¹

In our study, of about 50 patients, our results were available for 10 patients 2 (1%) of *A. niger* and 5 (2.5%) of *A. flavus* and 3 (1.5%) for *Candida* species when compared to Rao et al, *A. niger* 42 (44.7%) was the predominant species isolated. *A. flavus* 28 (29.8%) was the second most common species isolated. *A. fumigatus* 11 (11.7%), *Candida* species 8 (8.5%), *Mucor* 2 (2.1%) and *Penicillium* species 2 (2.1%) were the other species isolated.²²

CONCLUSION

This study demonstrates that the diagnosis of otomycosis requires vigilance from clinicians given its non-specific symptoms. Treatment regimens such as 1% clotrimazole and 2% salicylic acid coupled with mechanical debridement are generally effective. However, recurrence is not uncommon and eradication of disease can be particularly difficult in post mastoidectomy patients and in immuno-compromised patients.

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Institutional Ethics Committee

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