

Tackling Ear Fungus: A Comparative Analysis of Betadine and Clotrimazole in Otomycosis Management

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ABSTRACT

OBJECTIVE: To compare efficacy of Betadine and Clotrimazole in treatment of otomycosis

Study Design: Randomized Clinical Trial

Place & duration of the study : “Department of ENT, Head and Neck Surgery, Pakistan Institute of Medical Sciences, Islamabad” from 04 February 2022 to 03 July 2023.

METHODOLOGY: An approved letter was taken from Ethics Committee prior to starting this study. Patients were filtered from OPD of ENT Department, PIMS, Islamabad. Informed consent was taken from all patients prior to any intervention as a part of ethical concern. Patients were informed about their inclusion in the study, the procedure they underwent, its benefits and risks involved. In the study, patients were divided into the two groups, Group A and Group B. Group A was comprised of patients who were treated with standard antifungal drug i.e. Clotrimazole while Group B was given Betadine for the treatment of Otomycosis. The collected data was analyzed by using the SPSS 23 version.

RESULTS: We enrolled 110 patients in current study with mean age of patients treated with betadine was 46.45 ± 13.59 years and those treated with clotrimazole was 45.36 ± 12.88 years. We found complete response rate in betadine and clotrimazole treated patients at Day 4 was (14.5% vs 9.1%, $p=0.555$), at Day 10 was (56.4% vs 45.5%, $p=0.417$) and at Day 20 was (92.7% vs 74.5%, $p=0.036$). Hence the response of betadine was better than clotrimazole in the treatment of otomycosis.

CONCLUSION: We concluded that efficacy of betadine is better than clotrimazole in treatment of otomycosis. Betadine is effective in the treatment of Otomycosis as compared to Clotrimazole.

Key Words: Betadine, clotrimazole, efficacy, otomycosis

INTRODUCTION: An ENT disease that is prevalent in tropics is otomycosis. The fact that it recurs presents a significant difficulty to treating physician. Otomycosis, a prevalent condition affecting 9% to 27.2% of patients with external otitis media symptoms who visited to ENT centers, affects the external ear canal^{1,2}.

Additionally, infection effects ear drainage in more than 30% of the patients and often results in resistance to therapy for external otitis. Otomycosis has a number of side effects, including inner ear involvement and, in rare instances, mortality³.

Hearing loss may result from the growth of fungus ball or fungus mass made up of mycelia, epithelial cells, and wax in the ear canal. Acute infections can harm the skin on the neck and the cartilage in the ears too. Depending on the kind of fungus present, a fake

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veil of yeast in various colors may develop as chronic instances in the ear canal.

In immunocompromised people, prognosis for mycosis may be poor, particularly in situations of neutropenia and cellular immunodeficiency. The illness poses several difficulties for both patients and ENT experts, and it may recure even after extensive care and monitoring³.

Removal of the visible debris and fungus is ultimately a primary method of therapy for otomycosis. Antiseptics, steroids, antifungal agents, acidic solutions, and driers are some of topical drugs that are advised for treatment of this illness. Treatment for otomycosis should also alleviate physiological symptoms of external ear canal since antifungal drugs do not always successfully treat condition.

Recurrence rate of illness after therapy with boric acid in alcohol solution is 23%. Additionally, treating Candida infections with antifungal medications like clotrimazole or nystatin may be successful, but treating Aspergillus infections is still difficult. Otomycosis has

been linked to a broad variety of fungus, with *Aspergillus* being the most prevalent type⁴.

Consequently, a suitable treatment plan is required for therapy. The negative consequences of employing broad-spectrum antibiotics include the secondary fungal overgrowth and rising incidence of otomycosis. In addition, use of antibiotics for otitis externa may also end up with this problem^{3,5}.

Brazilian Journal of Otorhinolaryngology published a research from Iran's Birjand University of Medical Sciences (BUMS). According to this research, a total of 204 otomycosis patients were examined, including 102 individuals in each of the two therapy groups (betadine and clotrimazole). Overall, 42.15% male and 57.85% female otomycosis patients were present. Patients in both groups receiving betadine and clotrimazole treatment had average ages of 38.61 ± 15.45 and 40.37 ± 16.15 , respectively. Overall, the research found no evidence of a difference between the betadine and clotrimazole therapy groups in terms of age and sex⁶.

In a research, betadine and clotrimazole therapy groups' success rates in treating otomycosis were assessed. The findings showed that on fourth day after therapy, 13 patients in the betadine-treated group and 10 patients in the clotrimazole-treated group had a favorable response to treatment. However, on tenth day following therapy, 44 and 47 patients reported a favorable reaction, and on twentieth day, 70 and 68 patients in the group treated with betadine and clotrimazole, respectively⁷.

It is interesting that no negative effects were seen in any of the individuals treated with betadine. In fact between the betadine and clotrimazole treatment groups, there was no statistically significant difference in response to therapy on fourth, tenth, or twentieth day after treatment in trial ($p < 0.05$).

The aim of current study is to compare effectiveness of betadine with that of clotrimazole so that it may be a good choice for the otomycosis treatment in the developing countries like Pakistan, due to low cost, effectiveness and lack of the ototoxicity

METHODOLOGY: It was a single-Centre, Randomized Clinical Trial conducted on the otomycosis patients presented in the Department of ENT & Head and Neck Surgery, Pakistan Institute of Medical Sciences, Islamabad from February 2022 to July 2022.

Sample size was calculated with level of significance:5%, power of test:80%, and rate of complete resolution in Clotrimazole group P1:70%, and Povidone-Iodine group P2:91%. With these

parameters calculated sample size was 55 patients in each group with total of 110 patients. Non probability consecutive sampling was also carried out.

All the patients diagnosed with otomycosis on the basis of history (pain, pruritus, discharge) and otoscopic examination (presence of debris, hyphae) of age between 12-70 years and both male and female genders were included in study. Patients who had any type of otitis media, history of ear surgery, or history of treatment with antifungal agents and corticosteroids or had external ear anomaly were excluded from this study.

An approved letter was taken from Ethics Committee prior to starting this study. Patients were filtered from OPD of ENT Department, PIMS, Islamabad.

Informed consent was taken from all patients prior to any intervention as a part of ethical concern. Patients were informed about their inclusion in the study, the procedure they underwent along with its benefits and risks involved. After complete history taking, and otoscopic examination for the diagnosis of otomycosis patients were finally recruited in the study.

In the study, patients were divided into the two groups, Group A and Group B. Group A was consisted of patients who will be treated with standard antifungal drug i.e. Clotrimazole while Group B was given Betadine for the treatment of Otomycosis. Diagnosis of otomycosis was established on the basis of history and otoscopic examination.

Group B received povidone-iodine treatment in which the doctor used a syringe and 10 mL of 10% betadine solution to cleanse the patient's ears at each appointment. Every eight hourly, eight drops of the antifungal clotrimazole were administered to the other group. An ENT expert who was unfamiliar with the kind of therapy assessed patients 4, 10, and 20 days following for the above treatment.

Based on their clinical responses, the patients were divided into three groups: excellent responses (dry external auditory canal and tympanic membrane, no secretion), partial responses (slight discharge but not dry), and no responses (external auditory canal hypersecretion). Upon getting a full response, the therapy was stopped; if not, it was maintained. On the twentieth day, non-responders were deemed treatment-resistant.

The data was finally entered and analysed in SPSS version 23. Descriptive statistics were calculated for both quantitative and qualitative variables. Qualitative variables like gender, improvement in symptoms were

presented as frequency and percentage. Quantitative variables like age was presented as mean and standard deviation. Chi square test was applied to compare improvement in symptoms between both groups. The P value <0.05 was considered as significant.

RESULTS: We enrolled total 110 patients in current study, 55 in each group. The mean age of patients treated with betadine was 46.45 ± 13.59 years and in those treated with clotrimazole was 45.36 ± 12.88 years. The p value for age among both group was non-significant ($p=0.667$).

In betadine treated patients group 33(60.0%) were male & 22(40.0%) were female and in clotrimazole treated group 30(54.5%) were male & 25(45.5%) were female respectively. The p value for gender among both groups was also non-significant ($p=0.563$).

The complete response rate in betadine and clotrimazole treated patients at Day 4 was (14.5% vs 9.1%, $p=0.555$), at Day 10 was (56.4% vs 45.5%, $p=0.417$) and at Day 20 was (92.7% vs 74.5%, $p=0.036$).

Table 4: Results of Response Score Day 20 Among Study Groups

Response Score Day 4	Group A (Otomycosis treated with betadine)	Group B (Otomycosis treated with clotrimazole)	Total	Chi-Square Test	p value
Good Response	51 (92.7%)	41 (74.5%)	92 (83.6%)	6.658	0.036
Partial Response	3 (5.5%)	11 (20.0%)	14 (12.7%)		
No Response	1 (1.8%)	3 (5.5%)	4 (3.6%)		
Total	55 (100.0%)	55 (100.0%)	110 (100.0%)		

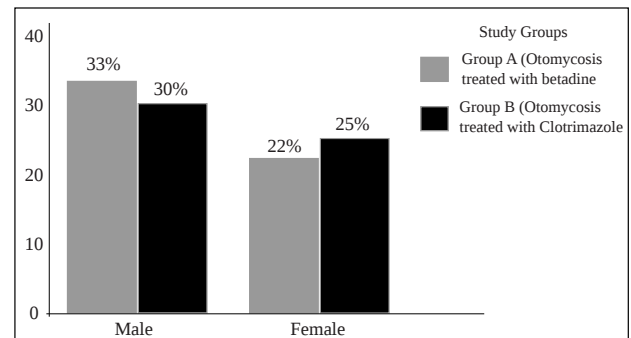


Figure 1: Gender Among Study Groups

Table 1: Results of Age (years) Among Study Groups

Study Groups	N	Mean	SD	t-test	p value
Group A (Otomycosis treated with betadine)	55	46.45	13.59	0.432	0.667
Group B (Otomycosis treated with clotrimazole)	55	45.36	12.88		

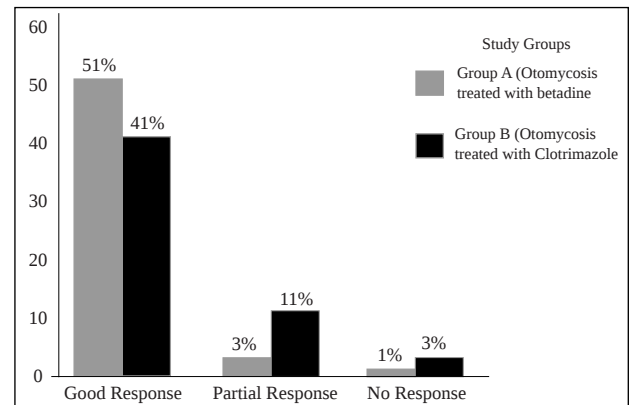


Figure 2: Response Score Day 20 Among Study Groups

Table 2: Results of Response Score Day 4 Among Study Groups

Response Score Day 4	Group A (Otomycosis treated with betadine)	Group B (Otomycosis treated with clotrimazole)	Total	Chi-Square Test	p value
Good Response	8 (14.5%)	5 (9.1%)	13 (11.8%)	1.179	0.555
Partial Response	32 (58.2%)	31 (56.4%)	63 (57.3%)		
No Response	15 (27.3%)	19 (34.5%)	34 (30.9%)		
Total	55 (100.0%)	55 (100.0%)	110 (100.0%)		

Table 3: Results of Response Score Day 10 Among Study Groups

Response Score Day 4	Group A (Otomycosis treated with betadine)	Group B (Otomycosis treated with clotrimazole)	Total	Chi-Square Test	p value
Good Response	31 (56.4%)	25 (45.5%)	56 (50.9%)	1.748	0.417
Partial Response	18 (32.7%)	20 (36.4%)	38 (34.5%)		
No Response	6 (10.9%)	10 (18.2%)	16 (14.5%)		
Total	55 (100.0%)	55 (100.0%)	110 (100.0%)		

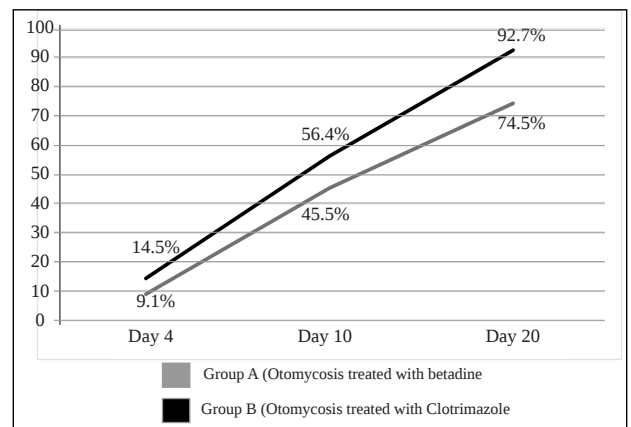


Figure 3: Response Score Among Study Groups

DISCUSSION: Otomycosis, a prevalent condition that affects 9% to 27.2% of patients with otitis external symptoms who are sent to ENT facilities, affects the external ear canal. Otomycosis has a number of side effects, including inner ear involvement and, in rare instances, fatality.

Hearing loss may result from the growth of a fungus ball or a fungus mass made up of mycelia. The removal of visible debris and fungus is the primary method of therapy for otomycosis. Steroids, antiseptics, acidic solutions, antifungal agents, and driers are some of the topical drugs that are advised for treatment of this illness. Treatment for otomycosis should also alleviate physiological symptoms of external ear canal since antifungal drugs do not always successfully treat condition.

Therefore we planned current study to compare effectiveness of betadine with that of clotrimazole so that it can be a good choice for otomycosis treatment in developing countries like Pakistan, due to its cost effectiveness and lack of ototoxicity.

We chose betadine because it is widely accessible and has been shown to be beneficial in treating chronic suppurative otitis media, one of risk factors for developing otomycosis⁸. It is chemically stable, reasonably priced, and there haven't been any reports of resistance in bacteria or fungus. Any topical antibiotic or antimicrobial should not be used excessively or carelessly since this might result in the development of resistant organisms.

Since there have been no studies to yet indicating the development of resistance, which is a growing cause for worry in this day and age, betadine solves this issue. Betadine is a preferable option in underdeveloped nations like Pakistan when a less expensive and efficient drug without ototoxicity is required.

We enrolled 110 patients in current study with mean age of patients treated with betadine was 46.45 ± 13.59 years and in those patients treated with clotrimazole was 45.36 ± 12.88 years. We found complete response rate in betadine and clotrimazole treated patients at Day 4 was (14.5% vs 9.1%, $p=0.555$), at Day 10 was (56.4% vs 45.5%, $p=0.417$) and at Day 20 was (92.7% vs 74.5%, $p=0.036$). The response of betadine was better than clotrimazole in the treatment of otomycosis.

A retrospective research conducted in Shanghai⁹ that took into account the demographics of otomycosis came to conclusion that females were more afflicted,

with a female:male ratio of 2:1. A research in Iraq had a similar outcome¹⁰. But in our research, we found majority of males. Male preponderance in this disease was shown by yet another retrospective investigation by Gutierrez et al¹¹. Therefore, we come to conclusion that there is no sex predominance to this condition.

In order to emphasize the significance of substituting traditional antifungals in routine practice, Aziz et al¹² also compared the efficiency of betadine with Clotrimazole ear drops in the therapy of Otomycosis in their research. After 14 days, they eventually found that 93% of the group getting betadine had full resolution of all symptoms, compared to 70% of the group receiving Clotrimazole ear drops. Their research revealed that betadine therapy significantly improved Otomycosis signs and symptoms when compared to ear drops containing clotrimazole. These results support the findings of current study as we found the success rate for betadine was 92.7% and for clotrimazole was 74.5% respectively.

In our clinical experience, we found that Azole group of antimycotics, such as Clotrimazole, do not completely alleviate the signs and symptoms of otomycosis in the majority of patients. Due to persistence of spores and possibility of major side effects such as invasive temporal bone infection, hearing loss, and tympanic membrane perforation, which are very rarely observed specifically observed only in immunocompromised individuals leading to treatment failure and repeated relapses¹³. since clotrimazole eardrops are irritating, prescription extra lignocaine drops to increase compliance is problematic, necessitating the need to research novel medicines.

Mofatteh et al⁶ found mean age of patients treated with betadine was 38.61 ± 15.65 years and in those patients treated with clotrimazole was 40.37 ± 16.15 years. They found complete response rate of betadine and clotrimazole treated patients at Day 4 was (13.1% vs 9.8%, $p=0.750$), at Day 10 was (43.1% vs 46.1%, $p=0.850$) and at Day 20 was (68.6% vs 66.7%, $p=0.036$). The response of betadine and clotrimazole was similar but betadine is more effective than clotrimazole in treating otomycosis.

Another study¹⁴ which examined the treatment efficacy of betadine and clotrimazole drop in otomycosis patients. One and two weeks following the end of the therapy, all patients were evaluated for therapeutic response. The final analytical findings demonstrated that there was no statistical difference between the two

treatment groups' responses to therapy. These results were different from findings of current study.

Teharia et al¹⁵ found that on fifth day, 21.8% of patients in group 'clotrimazole' and 23.6% of patients in group 'betadine' exhibited no response. At the 20th day of treatment assessment, 70.9% of group 'clotrimazole' participants and 72.7% of group 'betadine' participants shown a favorable response. They concluded that treatments for otomycosis, betadine and clotrimazole drops, were both equally efficacious. Betadine is inexpensive, non-ototoxic, non-resistant, and equally effective against bacterial and fungal infections. This research supports the use of betadine as the preferred therapy for otomycosis, particularly in poor nations.

CONCLUSION: From discussion it was concluded that efficacy of betadine is better than clotrimazole in the treatment of otomycosis. Betadine is effective in the treatment Otomycosis as compared to Clotrimazole.

Declaration: Conflict of interest: Authors declare no conflict of interest.

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