

Treatment of Otomycosis: A Comparative Study Using Miconazole Cream with Clotrimazole Otic Drops

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ABSTRACT

Objective: This study was conducted to compare the use of two different antifungal agents from the azoles family; Miconazole cream applied topically on the skin of the external canal and tympanic membrane and Clotrimazole otic drops.

Methods: Ninety patients aged (12-72) years who presented with otomycosis at Prince Hashim Hospital in Zarka between October 2007 to June 2009 were enrolled in this study. Patients were divided into two groups, group A (48 patients): patients were treated by toileting and application of Miconazole cream, group B (42 patients): patients were treated by toileting and using Clotrimazole 1% (otozol) otic drops. Patients followed after one and two weeks. One way ANOVA test was used to calculate the significant differences at $P < 0.05$ between the means of the study treatment groups

Results: Patients in group A (Miconazole) showed a better response to treatment in comparison to patients in group B (Clotrimazole drops).

Conclusion: Although the two treatment regimens showed no statistically significant difference due to the small number of cases, Miconazole cream after toileting is a better choice due to its lower cost and better compliance

Key words: Clotrimazole (otozol), Miconazole, Otomycosis, Toileting.

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Introduction

Otomycosis, also known as fungal otitis externa, has been used to describe a fungal infection of the external auditory canal and its associated complications, sometimes involving the middle ear.⁽¹⁾ It is one of the common conditions encountered in a general otolaryngology clinic setting and its prevalence has been quoted to be as high as 9% among patients who present with signs and symptoms of otitis externa.⁽²⁾ There is an alarming increase in its incidence due to the wide spread use of broad-spectrum antibiotics, steroids and other chemotherapeutic agents. It has been

postulated that indiscriminate use of topical ear drops has increased the incidence of fungal infections of the external auditory canal.⁽³⁾

The fungi that produce otomycosis are generally saprophytic fungi species that abound in nature and that form a part of the commensal flora of healthy external auditory canal. These fungi are commonly *Aspergillus* and *Candida*. *Aspergillus niger* is usually the predominant agent although *A.flavus*, *A.fumigatus*, *A. terreus* (filamentous fungi), *Candida albicans* and *C. parapsilosis* (yeast-like fungi) are also common.⁽⁴⁾

Fungal infections occur more frequently in tropical

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or subtropical climates or during periods of intense heat and humidity. It is common in patients who have undergone open cavity mastoidectomy and those who wear hearing aids.⁽⁵⁾ Jones (1965) reported that patients who had recurrent attacks of otitis externa had primary fungal infections with a super-added bacterial pathogen, the latter cleared up with treatment but the fungal infection was not eradicated, causing relapses.⁽⁶⁾

The clinical symptoms most frequently observed in these patients were burning sensation in the ear, pruritis, sensation of fullness in the ear, otalgia, otorrhoea, loss of hearing, tinnitus and severe headaches.⁽⁷⁾

There are four main classes of drugs for the treatment of fungal infections: polyenes, triazoles, nucleoside analogues, and echinocandins. The polyenes family includes Amphoterecin B and Nystatin. The Triazoles family, better known as azoles includes: Fluconazole, Clotrimazole and Miconazole. The mechanism of action of polyenes and azole families involves an essential chemical component called ergosterol found in the fungal cell membrane. The drug binds to ergosterol leading to its death.⁽¹⁾

Different studies in the literature compared the efficacy of clotrimazole and Miconazole otic solutions in the treatment of otomycosis, some indicating equal efficacy while other studies were in favor of Clotrimazole, but none of the studies compared the efficacy of Clotrimazole otic drops with miconazole cream (3, 6, 8, and 9).

This study was conducted to compare the use of two deferent antifungal agents from the azoles family; Miconazole cream applied topically on the skin of the external canal and tympanic membrane and Clotrimazole otic drops.

Methods

This comparative study was conducted at Prince Hashim Hospital in Zarka from October 2007 to June 2009, patients of ages (12-72) years who presented with otomycosis were enrolled in the study.

Exclusion criteria include:

- Otitis externa with external auditory meatus stenosis.
- Chronic discharging ear.
- Previous ear surgery.

The criteria of clinical diagnosis were history and

characteristic findings on otoscopic examination. The classical appearance looked like a grayish white plug resembling wet blotting paper, yellowish spores, a whitish, furry structure, or blackish spores covering the canal and sometimes the tympanic membrane also.

All the affected ears were thoroughly cleaned with suction under magnified otoscopy. After complete removal of debris and the fungal mass, cultures are not routinely obtained because there is generally a rapid response to the treatment. All the patients were instructed to avoid water entering their ears and they offered to choose between two topical treatment regimens; Group A 48 patients (53.3%) were treated by the Miconazole cream which was applied in the clinic directly onto the involved external auditory canal after toileting. Application is facilitated with a small syringe (3 cc) and an 18 gauge IV catheter. The miconazole cream is held in place by its innate viscosity and the shape of the external auditory canal. The ear canal is inspected 1 week later and residual cream is removed and a second application is used for persistent disease, all cases were followed up after 2 weeks. Group B 42 patients were treated by topical application of Clotrimazole 1% (Otozol) otic drops, 2-3 drops three times a day in the affected ear. All of them were followed up after, one and two weeks.

Patient's response to treatment was divided as follows:

Good response: when the external auditory canal and tympanic membrane were dry with no remnant of secretions.

Moderate response: when there was minimal secretions (not dry).

No response: still full of secretions.

One way ANOVA test was used to calculate the significant differences at $P < 0.05$ between the means of the study treatment groups

Results

Ninety-eight patients were initially enrolled in the study, aged from 12-72 years (mean age 42.3). Fifty three patients in group A and 45 patients in group B. There was no statistical difference in age or gender between the two groups.

Eight patients were excluded from the study, 3 presented with severe otitis externa, 2 had past history of discharging ear and 3 patients had previous ear surgery.

Table I. Presenting complaint at the time of diagnosis

Complaint	Number	%
Otalgia	50	55
Aural fullness	35	38.8
Itching	31	34.4
Otorrhea	26	28.8
Hearing loss	20	22.2

Table II. Treatment response after one week

Treatment response	Group A		Group B		P value
	Toileting+miconazole (48)		Toileting+otozol E/D (42)		
	No	%	No	%	
Good	35	72.9	23	54.7	0.140
Moderate	8	16.6	12	28.5	
No	5	10.4	7	16.6	

Table III. Treatment response after 2 weeks

Treatment response	Group A		Group A		P value
	Toileting+miconazole (48)		Toileting+miconazole (48)		
	No	%	No	%	
Good	40	83.3	30	1.4	0.075
Moderate	6	12.5	9	21.4	
No	2	4.1	3	7.1	

Total number of patients found to be eligible in our study was ninety, 48 patients in group A (toileting and Miconazole cream). Forty two patients in group B (toileting and Clotrimazole otic drops).

The most common presenting complaint at time of diagnosis was otalgia, followed by aural fullness, itching, and otorrhea and hearing loss. (Table I)

After one week, 35 patients from group A showed good response, 8 patients moderate response and 5 patients still with no response, while 23 patients from group B found to have good response, 12 with moderate response and 7 with no response. The results were statistically not significant with a significance value 0.14, which is less than the significance level of 0.05. (Table II)

After two weeks, 40 patients in group A found to have good response, 6 had moderate response and only 2 patients had no response. In group B, 30 patients showed good response, 9 had moderate response and 3 patients with no response. The results were statistically not significant with a significance value 0.075. (Table III)

Discussion

Otomycosis is an entity frequently encountered by otolaryngologist and can usually be diagnosed by clinical examination.⁽⁸⁾ Treatment recommendations have included local debridement, discontinuation of topical antibiotics, and local/systemic antifungal

agents.⁽²⁾ In Jordan, particularly at the Royal Medical Services, we usually treat otomycosis by mechanical cleansing of the canal followed by local application of antifungal cream or prescribing antifungal otic drops to the patient and follow them every week till recovery. In our study, we compared two modalities of otomycosis treatment, cleaning of visible fungal elements in the external auditory canal by suction (toileting) and application of Miconazole cream directly onto the involved external auditory canal skin at the clinic by ENT doctor and toileting followed by use of otazol ear drops by the patients.

In our study application of miconazole cream after toileting the external auditory canal gave the best result as 40 patients out of 48 (83%) showed complete recovery after two weeks. Although using clotrimazole ear drops after toileting gave good response but this modality is still less effective than application of miconazole cream after both one week and two weeks, statistically the results were not significant in both groups. Although multiple in vitro studies have examined the efficacy of various antifungal agents, there is no consensus on the most effective agent.⁽⁹⁾ Some studies showed that clotrimazole was one of most effective agents for management of otomycosis, with reported rate of effectiveness that varies from 95% to 100%.⁽¹⁰⁾ Miconazole cream 2% has also demonstrated an efficacy rate of 90%.⁽¹¹⁾

Azoles are synthetic agents that reduce the concentration of ergosterol, an essential sterol in the normal cytoplasmic membrane. They are a class of five-membered nitrogen heterocyclic ring compounds containing at least one other noncarbon atom, nitrogen, sulfur or oxygen.⁽¹²⁾ Clotrimazole is the most widely used topical azole.⁽¹³⁾ It is available as powder, a lotion, and a solution. It is considered free of ototoxic effects.⁽¹⁴⁾ Miconazole is an imidazole that has been successfully used for over 30 years for the treatment of superficial and cutaneous disease. This agent is distinguished from other azoles by possessing two mechanisms of action. The first mechanism is shared with other azoles and involves the inhibition of ergosterol synthesis. Another mechanism involves inhibition of peroxidases, which results in the accumulation of peroxide within the cell resulting in cell death.⁽¹⁵⁾

Predisposing factors such as a failure in the ear's defense mechanisms (changes in the coating epithelium, changes in pH, quantitative and qualitative changes in ear wax), bacterial infection, hearing aid or hearing prosthesis, self inflicted trauma (use of Q-tips to clean the ears, swimming, broad spectrum antibiotic agents, steroids and cytostatic medications, neoplasia and immune disorders, all of which can render the host susceptible to the development of otomycosis.⁽¹⁶⁾

The analysis of complaints reported by patients investigated in this study showed that the most common symptoms were otalgia followed by aural fullness and itching, while in a study done by Kurnatowski and Filipiak showed that the most common symptom is pruritus then sensation of fullness and ear discharge.⁽¹⁷⁾

Limitations of the Study

Further future study with a larger number of patients and longer period of follow up is needed

Conclusion

Although the two treatment regimens showed no statistically significant difference due to the small number of cases, Miconazole cream after toileting is a better choice due to its lower cost and better compliance.

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