

## EFFECTIVENESS OF CHLOROXYLENOL AND CHLORHEXIDINE - CETRIMIDE DISINFECTANTS ON FUNGAL ISOLATES FROM CLINICALLY SUSPECTED CASES OF UNCOMPLICATED OTOMYCOSIS

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**ABSTRACT: BACKGROUND:** Otomycosis is a superficial mycotic infection of the external auditory canal. The infection may be either subacute or chronic in nature. Otomycosis occurs world-wide but is more common in tropical and subtropical countries. Fungal agents most commonly causing otomycosis are *Aspergillus niger*, *Candida albicans*, *Aspergillus flavus*, *Aspergillus fumigatus*, *Candida parapsilosis*, *Penicillium*, *Mucor*, *Rhizopus*, *Absidia* and *Scopuloriopsis* spp. Many agents have been recommended for treating otomycosis, but no preparation has been widely accepted. Vigorous cleaning of the external auditory canal remains the mainstay in treating otomycosis, along with usage of topical anti-fungal agents. **OBJECTIVE:** To compare the efficacy of chloroxylenol (Dettol) and chlorhexidine- cetrimide (savlon) with 1% clotrimazole+1% lidocaine ear drops. **METHODS AND MATERIALS:** Agar well diffusion method was used on the isolates obtained from uncomplicated clinically diagnosed otomycosis cases. **RESULTS:** The isolates, *Aspergillus niger*, *Aspergillus flavus*, *Candida albicans*, *Candida glabrata* and *Candida parapsilosis* were susceptible to undiluted concentration of dettol and not susceptible to savlon. **CONCLUSION:** Dettol can be used to reduce the fungal burden in the external auditory canal, and it should be followed by topical application of clotrimazole ear drops to cure the disease.

**KEY WORDS:** Otomycosis, *Aspergillus*, *Candida*.

**INTRODUCTION:** Otomycosis is a superficial, subacute or chronic mycotic infection of the external auditory canal; however the disease may occur in the middle ear if the tympanic membrane is perforated <sup>1-4</sup>. Usually unilateral and presents with symptoms like pruritis, discomfort and pain in the ear, aural fullness, tinnitus, hearing impairment and sometimes discharge. It occurs world-wide but is more common in tropical and subtropical countries <sup>5</sup>. Fungal agents most commonly causing otomycosis are *Aspergillus niger*, *Candida albicans*, *Aspergillus flavus*, *Aspergillus fumigatus*, *Candida parapsilosis*, *Penicillium*, *Mucor*, *Rhizopus*, *Absidia* and *Scopuloriopsis* spp. It is estimated that approximately 5-25% of the total cases of otitis externa are due to otomycosis <sup>6,7</sup>. Predisposing factors of otomycosis include chronic infections of the ear, use of oils, hearing aid, eardrops, steroids, swimming, immuno-compromised state and fungal infection elsewhere in the body like dermatomycosis and malnourishment in children <sup>7-10</sup>. Topical antiseptics and antifungal agents are frequently used for the treatment of otomycosis.

### AIMS AND OBJECTIVES:

- (1) To isolate and identify the fungal isolates from clinically suspected cases of otomycosis

- (2) To know the effectiveness of chloroxylenol and chlorhexidine- cetrimide on fungal isolates by agar well diffusion method

**METHODS AND MATERIALS:** In this prospective study, mycological analysis was carried out on samples collected from auditory canal of 35 patients clinically suspected of otomycosis in the outpatient department of Oto-Rhino-Laryngology (E.N.T.) between the period from September 2012 to February 2013. The patient's clinical profiles regarding age, sex, laterality, and clinical presentation were documented. Patients who were already on treatment for otomycosis were excluded from the study. Samples were collected in a sterile universal container and were immediately transported to the department of Microbiology.

Direct microscopic examination of the obtained specimens was carried out for detection of fungal elements by KOH (10%) mount and Gram's stain. Sample was inoculated into Sabouraud's Dextrose Agar and the tubes were incubated at 25°C and 37°C for a minimum period of 4 weeks. The culture tubes were examined for the presence of growth every 3-4 days. Identification of the fungus was done by Lacto phenol Cotton Blue Mount preparation, Gram's Stain and colony morphology. Slide culture examination was used for differentiation of morphology of filamentous fungi. Biotyping of *Candida* species was performed using Germ tube Test, detection of Chlamydospore formation on Corn Meal Agar and Hi Chrome *Candida* differentiation media. The turbidity of fungal spore suspension was prepared by hemocytometric method. Lawn culture of fungal isolates was made on Sabouraud's Dextrose Agar and four wells with 6mm bore were dug with the help of cork borer. 100 microlitre of disinfectants was dispensed in the dug well. After 24 hours the zone of inhibition (ZOI) was measured using ZOI measuring scale. The 1% clotrimazole+1% lidocaine ear drops was taken as standard to which other disinfectants were compared. The normal saline was used as negative control. The standard strain used in the study was *Candida albicans* ATCC 22019.

**RESULTS:** In our study, among the otomycosis patients, 54.2% were caused by *Aspergillus niger*, 13.6% by *Aspergillus flavus*, 2.2% by *Aspergillus fumigatus*, 9.0% by *Candida* species and 11.3% showed mixed growth of fungi. The study included patients of age group ranging from 13 -70 years. The youngest was a 13 year old male patient and the eldest was a 70 year old male patient. Maximum number of cases were between 30-39 years of age. We observed increased incidence of otomycosis among females (54.5%) and more involvement of left ear. The predominant complaints were fullness of ear and itching, followed by earache, ear discharge and tinnitus. (Table no 1) Clinical examination revealed canal skin erythema and fungus debris in all cases. 60.8% of the patients gave history of water entry into the external auditory canal and 45.9% of the patients gave history of use of unsterile material – oil, swabs, and sticks. (Table no 2) The ZOI for 1% clotrimazole+1% lidocaine ear drops against the *Aspergillus* species and *Candida* species was in the range between 36– 38 mm and the ZOI for chloroxylenol was in the range between 54 – 56 mm which was above the ZOI of the standard. Chlorhexidine- cetrimide was ineffective and showed ZOI of 16-18mm.

**Table: 1. Clinical presentation of mycotic otitis externa**

Symptoms	Percentages (%)
Itching	66.4
Pain	60.2

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Fullness of ear	82.9
Discharge	18.9
Tinnitus	0.5
Others	0.5

**Table: 2. Predisposing factors for mycotic otitis externa**

Predisposing Factors	Percentage (%)
Chronic Suppurative Otitis Media	27
Use of ear drops	21.6
Use of head cloths	27
Water entry into the ear	60.8
Use of unsterile material – oil, swabs, sticks	45.9
Previous surgeries	9.4
Others	4.05

**DISCUSSION:** The most common fungus isolated from cases of otomycosis in our study was *Aspergillus niger* which was also the most common isolate reported in other studies <sup>11, 12</sup>. To our knowledge, this is the first report in the English literature investigating the in vitro efficacy of chloroxylonol and chlorhexidine- cetrimide disinfectants on *Aspergillus* species, *C. albicans* and *C. glabrata* isolated from the ears with otomycosis. We employed the agar well diffusion method as described by Senthil Kumar and M Kamaraj <sup>13</sup>. We concluded that chloroxylonol has a strong activity against all the fungal isolates from otomycosis and hence can be used for aural cleaning before using the antifungal agents. The study being an in-vitro study and the sample size being small were the limitations of the study. We further recommend in-vivo study of usefulness of these disinfectants for aural toileting and to reduce the fungal burden in cases of otomycosis.

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