

Otomycosis associated with active chronic otitis media

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الخلاصة

جمعت 70 عينة من المرضى المراجعين الى مستشفى الديوانية التعليمي والذين يعانون من التهاب الأذن الوسطى المزمن وخلال الفترة من تموز إلى تشرين الثاني 2011

أظهرت نتائج الدراسة إن 45 (64.28%) من العينات أعطت نتيجة موجبة للنمو الفطري في حين أن 25 (35.71%) أعطت نتيجة سالبة للنمو الفطري. إن المرضى الذين تتراوح أعمارهم بين (61-70) سنة و(71-80) سنة كانوا أكثر تحسسا للإصابة بالتهاب الأذن الوسطى الفطري مقارنة بالأعمار الأخرى .

ومن الفطريات الشائعة في احداث هذه الأصابة هي *Aspergillus niger* (26.92%), *Candia albicans* (19.24%), *A.flavus* (15.38%), *A.fumigatus* (11.53%), *Penicillum digitatum* و *Cephalosporium* sp (7.69%) بينما بلغت نسبة كل من *Alternaria alternata* and *Rhizopus* sp (5.7%) لكل منهما على التوالي .

Abstract

Seventy samples from out patients seeking medical care in Al-Diwaneya teaching hospital were screened for identification of fungi associated with active chronic otitis media during June to December 2011

There were 45 (64.28%) had positive culture for fungal growth while 25 (35.71%) patients had negative culture for fungal growth. The patients from 61-70 and 71-80 years were more susceptible to fungal otitis externa than other age groups .the most common causal fungal isolates were *Aspergillus niger* (26.92%) followed by *Candia albicans* (19.24%), *A.flavus* (15.38%), *A.fumigatus* (11.53%), *Penicillum digitatum* and *Cephalosporium* sp (7.69%) for each one while *Alternaria alternata* and *Rhizopus* sp (5.7%) for each one .

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Introduction

Chronic otitis media (COM) is major health problem in developing countries because of poor nutrition, improper hygiene and lack of health education. Due to advent of newer and sophisticated antibiotics, the microbiological flora is changing constantly. (1) COM defined as condition of the middle ear that is characterized by persistent or recurrent discharge through a chronic perforation of the tympanic membrane; due to the perforated tympanic membrane microorganism can gain entry into the middle ear from the external ear canal. Infection of the middle ear mucosa subsequently results in ear discharge (2).

The basic feature which is common to all cases of chronic otitis media is the presence of an non-intact tympanic membrane. (1) Many authors have focused their attention on the bacterial flora of chronic suppurative otitis media, but very little is known about the mycological aspects of these, the importance of which has been increasing in the recent years because of broad spectrum antibiotics, corticosteroids, cytotoxic chemotherapy and increase in the number of immune deficiency conditions. (3). The aim of this research work was to isolate and identify the fungi associated with chronic otitis media.

Material and methods

Collection of samples.

Purulent materials were collected from (70) different patients suffering from chronic otitis media attending to Al-Diwanyia teaching hospital during June –December 2011.

The samples were collected with sterile swab sticks which were properly labeled indicating the source, date, time of collection and age of patients, the samples were transported in cooler boxes to the microbiology laboratory of the medical college (4).

Fungal isolation and identification

The swab sticks were streaked directly on the Sabouraud Dextrose Agar (SDA) plates and incubated at 25 ± 2 C. The growth was visible within 5-7 days. Each fungal growth was identified based on their morphological and cultural characteristics.

and microscopic examination was done using lacto phenol staining technique (5).

Statistical analysis

The prevalence of organisms was determined and expressed in percentage.

Results and Discussion

A total of 70 patients were included in this study ,age of them ranged from 10-80 years From the 70 patients enrolled in the study ,there were 45 patients (64.28%) had positive results for fungal growth on SDA media ,while remaining 25 patients (35.71%) had negative results for fungal growth at the same media this result may be due to bacterial or virus otitis externa and this results near to that observed by,(6) . From 45 patients with COM there were 52 fungal isolates ,the results of this study also revealed that the patients from 61-70 were more susceptible to otitis externa infection by fungi than the other groups Table (2) ,this fact also emphasized by the study of,(7),(8) . However the susceptibility of old patients to otomycosis is traceable to their immune system.

Table (1) Age range of patients

| Age range in years | No. of patients (%) |
|--------------------|---------------------|
| 10-20 | 2(4.44) |
| 21-30 | 2(4.44) |
| 31-40 | 4(8.88) |
| 41-50 | 6(13.33) |
| 51-60 | 8(17.78) |
| 61-70 | 9(20) |
| 71-80 | 14(31.11) |
| Total | 45 (100) |

The results summarized in table (3) showed a total of eight fungal species belong to six different genera namely *Aspergillus* ,*Penicillium* ,*Rhizopus* ,*Alternaria* ,*Cephalosporium* and *Candida* were isolated during this study.

Among identified fungi *A.niger* was found to be the most prevalent fungal species with (26.92%) followed by *Candida albicans* (19.24%) ,*A.flavus* (15.38%) *A.fumigatus* (11.53%),*Penicillium digitatum* and *Cephalosporium* sp (7.69%) for each one While *Alternaria alternata* and *Rhizopus* sp had lowest percentage (5.76%) for each one. The results of this study were near to result observed b.,(8) and (9)

Table (3)percentage frequency of fungal causing otomycosis.

| Fungal isolates | Number of isolates | Percentage of occurrence (%) |
|------------------------------|--------------------|------------------------------|
| <i>Aspergillus niger</i> | 14 | 26.92 |
| <i>Candida albicans</i> | 10 | 19.24 |
| <i>Aspergillus favus</i> | 8 | 15.38 |
| <i>Aspergillus fumigatus</i> | 6 | 11.53 |
| <i>Penicillium digitatum</i> | 4 | 7.69 |
| <i>Cephalosporium</i> sp | 4 | 7.69 |
| <i>Rhizopus</i> sp | 3 | 5.76 |
| <i>Alternaria alternata</i> | 3 | 5.67 |
| Total | 52 | %100 |

Although there has been controversy with respect to whether fungi are the true infective agents versus mere colonization species as a result of compromised local host immunity secondary to bacterial infection ,most clinical and laboratory evidence to date supports otomycosis as a true pathogenic entity ,with *Candida* and *Aspergillus* as the most common fungal species isolated (10,11 ,12).

Classically, fungal infection is the result of prolonged treatment of bacterial otitis externa that alters the flora of the ear canal ,mixed bacterial and fungal infections are thus common, However ,fungus is occasionally the primary pathogen in otitis externa ,especially in the presence of excessive moisture or heat (13).

Study by (14) assessed the contribution of otological antibiotic drops to the development of otomycosis their research revealed that ofloxacin may contribute to the development of otomycosis in two ways ,first this agent is bactericidal to most bacteria in the external

auditory canal, and fungal proliferation may occur because of the lack of competing bacterial growth, second, in contrast to other topical otic antibiotics which typically have apH of 3-4, ofloxacin has apH of 7, this more neutral solution does not acidify the pH of the external auditory canal skin making it a more optimal environment for fungal proliferation (*Aspergillus* grows optimally at apH of 6). These two properties of topical ofloxacin may explain its association with otomycosis.

In conclusion, the diagnosis of otomycosis can be challenging given its non-specific symptoms. Recurrence after treatment is not uncommon, and eradication of disease can be particularly difficult in postmastoidectomy patients (15).

Otolaryngology's should remain alert for otomycosis and should consider obtaining culture when this disease is suspected.

References

- 1-Haruindzr A., Mugliston, T.; Odonoghue, G. (2003) Otomycosis: a continuing problem. *J. Laryngol. Otol.* 99:327-33.
- 2-Alcoloy, A.; Loh, K.S.; Tan, K.K. (2006) Otitis externa: The clinical pattern in tertiary institution in Singapore. *Ann. Acad. Med. Singapore.* 27(2):215-8.
- 3-Pradhan, B.; Tuladhar, N.R.; Amatya, R.M. (2003) Prevalence of otomycosis in out patients department of otolaryngology in Tribhuvan University Teaching Hospital, Kathmandu, Nepal. *Ann. Oto. Rhinol. Laryngol.* 112:384-7
- 4-Collee, J. G. ; Fraser, A. G. ; Marmion, B. P. and Simmons, A. (1996) Mackie and McCartney Practical medical microbiology, 14th ed. Longman Singapore publishers Ltd. , Singapore .
- 5-Collins, C.H.; Lyne, P.H. (1984) Microbiological methods 5th Ed. Butterworth and co-publisher Ltd. Ibadan, pp.300-341.
- 6-Paulose, K.O.; Al-Khalifa, S.; Shenoy, P. (2010) Mycotic infection of ear (Otomycosis): a prospective study. *J. Laryngol. Otol.* 103:30-5.
- 7-Tang, H.; Jefferey, T.; Vrabec, M.D.; Donald, Y. and Newton, J. (2008) Otomycosis: Clinical features and treatment implications. *Otolaryngology, head and neck surgery*

- 8-Rutt ,A.;Sataloff ,L.,Robert ,T.(2008) Aspergillus otomycosis in immunocompromised patients.EAR ,Nose and throat Journal .87:0145-5613.
- 9-Ozcan ,M.;Ozcan,K.M.;Kararshan ,A.(2010)Concomitant otomycosis and dermatomycosis :aclinical and microbiological study .Ear .Arch.Otorhinolaryngol .260:24-7.
- 10-Lucente, F.E.(1993) Fungal infections of the externa ear .Otolarnol clin.North America ,26:995-1006.
- 11-Kaur,R.;Mittal,N.;Kakkar ,M. (2000) Otomycosis :aclinicomycological study .Ear ,Nose ,Throat ,J.;79:606-9.
- 12-Vennewald ,I.;Schonlebe,J.;Klemm,E.,(2003).Mycological and histological investigations in humans with middle ear infections .mycoses ,46:12-8.
- 13-Sander ,R.(2001) Otitis externa :Apractical guide to treatment and prevention .AM.Fam physican ,63:927-36.
- 14- Jackman ,A.; Ward R.;April,M.;Bent ,J.(2005) Topical antibiotic induced otomycosis .Int .J.ped .otorhinolaryngol
- 15-Ho,T.;Vrabec ,J.;Yoo,D.;Coker ,N.J.(2006) Otomycosis :Clinical features and treatment implications .Otolaryngology, head ad neck surgery 135(5):787-91.