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# Otomycosis: A common problem in North Iraq

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**Abstract**
Otomycosis is a common disease in North Iraq. Of the 219 cases diagnosed clinically in Mosul Teaching Hospital seen during a 15 month period, 179 were due to fungus infection. The disease was more frequently encountered in young adults whose age was range from 16–30 years. The incidence of the disease was significantly higher in females (65.4 per cent), mainly housewives, than in males. Aspergillus species were the dominant isolated fungi (92.1 per cent).

## Introduction

Otomycosis, or fungal infection of the external auditory canal, is generally considered to be infrequent (Than *et al.* 1980). The disease is not highly infectious but has a tendency to be confused with chronic otitis media. In the tropics, subtropics and in exceptional cases in moderate climates, this disease may occur in a severe form (De Wit, 1974).

Different studies on various aspects of otomycosis started in 1843 and 1844 (Yassin *et al.*, 1964; Bezjak and Arya, 1970). Ismail (1962) maintained that *A. niger* was the causal fungus encountered in all cases of otomycosis, while Yassin *et al.*, (1964) isolated many species of Aspergillus. However, Mugliston and O'Donoghue (1985) found that Aspergilli and Candida were the dominant fungal pathogens of the external ear, and *Staph. aureus, Pseudomonas* and *Proteus* the dominant bacterial pathogens.

The aim of this work is to know the pattern of fungi encountered in cases of otomycosis in North Iraq together with that of associated bacteria as well as the clinical aspects.

## Patients and methods

This work was performed during a period of 15 months from 1 March 1987–30 May 1988. Two hundred and nineteen patients attending the ENT outpatient clinic in Mosul Teaching Hospital, with clinical diagnosis of otomycosis, were included in this study. Cases of chronic suppurative otitis media were excluded.

Swabs were taken by the otologist from the infected ear and sent to the laboratory without delay.

Direct microscopic methods: examination of materials obtained from the infected ear canal, was performed for the patients after mount in 20 per cent potassium hydroxide solution. Mycelial elements, and occasionally—heads of aspergilli, as well as budding yeast cells with pseudohyphae of Candida, were seen.

Culture methods: Sabouraud's glucose agar with chloramphenicol (0.05 mg/ml) and Sabouraud's glucose agar with chloramphenical and actidione (0.5 mg/ml). Incubation was carried out at room temperature (28–30°C) for 2–15 days.

The isolated fungi were identified by microscopic and culturel characteristics. Germ tube test and morphology on corn meal agar were also studied to aid accurate identification of *Candida albicans* from other candida species. Bacterial cultures were also performed (blood agar

TABLE 1
FREQUENCY OF SYMPTOMS IN 179 PATIENTS EXAMINED WITH OTOMYCOSIS

| Symptoms | Number | Per cent |
|---|---|---|
| Itching | 140 | 78.2 |
| Discharge | 112 | 62.6 |
| Pain (and ext. ear boil) | 96 | 51.4 |
| Tinnitus | 86 | 48.0 |
| Impaired hearing | 68 | 38.0 |

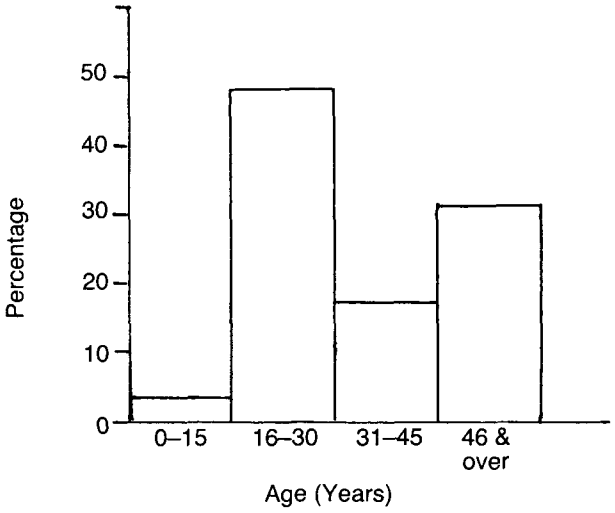



FIG. 1
Age distribution of otomycosis.

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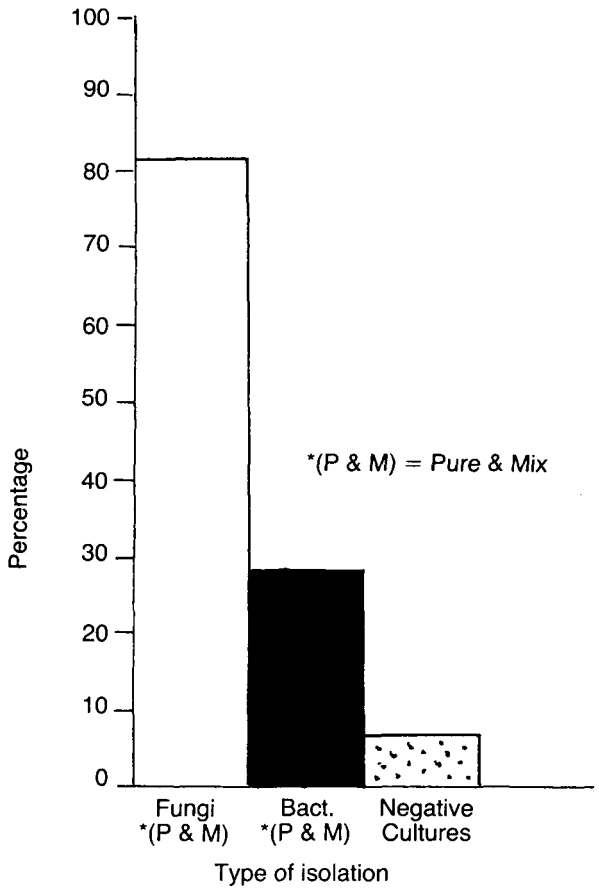



FIG. 2
The isolation percentages of fungi, bacteria and negative cultures.

and MacConkey's media). The normal fungal and bacterial flora of the external ear canal of 75 apparently normal individuals from various sources were also studied; this control group, included infants, children and adults, belonging to both sexes.

## Results

### *Clinical presentation*

A variety of clinical symptoms of otomycosis were detected; these are recorded, in descending frequency, in Table I.

### *Epidemiological features*

#### *Age*

Figure 1 shows a bimodal distribution with the highest incidence (48.0 per cent) between 16–30 years. The age range was from 2–80 years.

TABLE II
SEX AND LATERALITY

| Sex | Laterality R | L | Bilateral | Total | Per cent |
|---|---|---|---|---|---|
| Male | 30 | 29 | 3 | 62 | 34.6 |
| Female | 59 | 52 | 6 | 117 | 65.4 |
| Total | 89(49.7%) | 81(45.3%) | 9(5.0%) | 179 | 100 |

#### *Sex and laterality*

Table II shows that the incidence of the disease was significantly higher in females (65.4 per cent) than in males. The infection was usually unilateral (95.0 per cent), with no clear difference concerning the side involved.

#### *Occupation*

Table III represents the relationship between occupation and the incidence of otomycosis.

#### *Mycological findings*

The total number of fungi isolated from the 219 cases studied was 179 (81.7 per cent) (Fig. 2).

It is obvious from Table IV that Aspergilli were the predominant fungi isolated from cases of otomycosis, comprising 92.1 per cent. The most common species obtained was *A. niger* which constituted 70.9 per cent of the total isolated fungi.

Table V shows that of the 179 cases of fungal infections, 142 (79.3 per cent) yielded pure cultures, while the remaining 37 were mixed.

## Discussion

The factors present in the external auditory meatus, such as moisture, warmth, and some proteins or carbohydrates, fulfil the requirements for many fungi and bacteria to grow and flourish (Conley 1948; Youssef and Abdou, 1967). Other substances such as epithelial debris, serous exudate and metabolic by-products of fungi and bacteria also provide a suitable medium for moulds and yeasts, and also bacteria, to grow in the external ear canal (Youssef and Abdou, 1967).

The findings of the current study shows that otomycosis was more frequently encountered in young adults whose ages ranged from 16–30 years (Fig. 1), which is in accordance with the results of Mugliston and O'Donoghue (1985). The disease is usually unilateral and no difference in laterality has been observed (Table II), which confirm the phenomenon reported by De Wit (1974) that the disease is not highly infectious.

The importance of the fungal flora of the air as the possible agents of otomycosis is a well known fact (Yassin *et al.*, 1964; Ismail 1962). A higher incidence of the disease was recorded in females and mainly in housewives (Tables II, III). The latter frequently clean and sweep the floor of the houses, and the resulting dust containing fungal spores mixed with the air of the atmosphere and acts as a predisposing factor for the initiation of the disease.

TABLE III
THE RELATIONSHIP BETWEEN THE OCCUPATION AND INCIDENTS OF OTOMYCOSIS

| Occupation | Number | Per cent |
|---|---|---|
| Housewives | 107 | 59.8 |
| Workers | 36 | 20.1 |
| Students and Teachers | 27 | 15.1 |
| Jobless persons (old age) | 9 | 5.0 |
| Total | 179 | 100.0 |

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TABLE IV
NUMBERS AND PERCENTAGES OF THE ISOLATED FUNGI

| Isolates | Number | Per cent |
|---|---|---|
| *Aspergillus* | | |
| *A. niger* | 127 | 70.9 |
| *A. flavus* | 28 | 15.6 |
| *A. fumigatus* | 10 | 5.6 |
| | 165 | 92.1 |
| *Candida* | | |
| *C. albicans* | 9 | 5.0 |
| *C. species* | 4 | 2.3 |
| | 13 | 7.3 |
| *Rhizopus* | 1 | 0.6 |
| Total | 179 | 100.0 |

The data summarized in Tables IV, V shows that Aspergilli, mainly *A. niger,* and *Candida* were the main fungal pathogens of the external ear canal, and *Staph. aureus, Pseudomonas,* and *Proteus* were the dominant bacterial pathogens. These findings were to a certain extent similar to those recorded by other workers (Senturia, 1957; Youssef and Abdou, 1967; Than *et al.*, 1980; Mugliston and O'Donoghue, 1985). They can be readily isolated from house dust. It has been suggested by Senturia (1957) that staturated and unsaturated fatty acids inhibit the growth of most fungi, but ear wax may aid heavy growth of Aspergilli inspite of containing such acids as noted by Akobjanoff *et al.* (1954). Furthermore, the pH of the normal ear canal is on the acid side; Yassin *et al.* (1964) have demonstrated that the common pathogenic Aspergilli have their optimal growth rate in the pH range of 5–7.

It was also reported by Mclaurin *et al.,* (1965) that there is an interruption of the external auditory canal lining in case of otitis externa. In addition, some fungi e.g. *A. fumigatus* elaborate a haemolytic exotoxin which has the ability to change skin resistance (Mugliston and O'Donoghue, 1985). *A. fumigatus* also produces an antibiotic active against *Staph. aureus* and Table V shows that it was the only Aspergillus species which was not accompanied by *Staph. aureus* in mixed infections.

TABLE V
FUNGI ISOLATED IN PURE AND MIXED CULTURES

| Isolate | Pure | Mixed | Total | Main bateria |
|---|---|---|---|---|
| *A. niger* | 102 | 25 | 127 | *Staph. aureus* (14), *Pseudomonas* (4), *E. coli* (2), *Kleb.* (2), *Prot.* (2) |
| *A. flavus* | 22 | 6 | 28 | *Staph. aureus* (4), *E. coli* (1), *Serratia* (1) |
| *A. fumigatus* | 7 | 3 | 10 | *Pseudom.* (1), *Prot.* (2) |
| *Candida* | 10 | 3 | 13 | *Pseudom.* (2), *Prot.* (1) |
| *Rhizopus* | 1 | 0 | 1 | |
| Total | 142 (79.3%) | 37 (20.7%) | 179 (100%) | |

## Conclusion

Otomycosis is still a common disorder in this area and remains a diagnostic problem.

Aspergilli and Candida should be considered as the primary cause of otomycosis.

In the present study, otomycosis appears to have a bimodal age distribution, and is a predominantly unilateral disorder.

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