



ORIGINAL RESEARCH PAPER

Medical Science

FUNGAL ETIOLOGY OF OTITIS EXTERNA IN TYPE 2 DIABETES MELLITUS PATIENTS-A STUDY IN PERIPHERAL HEALTH FACILITY

KEY WORDS: Otitis externa, Fungus, Diabetes Mellitus, Candida species

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ABSTRACT

Otitis externa (Ear canal infection) is an inflammation or infection of outer ear canal, the passage leading to the ear drum or tympanic membrane. Patients with Diabetes mellitus are in immune-compromised state and more prone to ear infections. Diabetes is considered as one of the predisposing factor for Otitis externa. This is a prospective study done on patients attending in O.P.D of C.H.Nagrota bagwan over a period of 6 months. Samples from infected ears are collected and processed using Sabourads Dextrose Agar and are identified exactly by Slide Culture technique and by using Lactophenol Cotton blue stain. Out of 50 suspected cases of the Mycotic Otitis externa, 38(76%) were found to be positive for fungal infection. Most commonly isolated fungi in this study was Candida species (42%) followed by Aspergillus species (22%) and Rhizopus oryzae (20%). Candida albicans was most common. The study also show that highest incidence of fungal infection occurred in the rainy season whereas the lowest incidence occurred in summer season. We also conclude that fungal culture is beneficial for diagnosing otitis externa. Type 2 Diabetes Mellitus patients are prone to ear infections as well as other infections, diagnosing exact etiology plays an important role in early instigation of treatment.

INTRODUCTION

Otitis externa (Ear canal infection) is an inflammation or infection of outer ear canal, the passage leading to the ear drum or tympanic membrane. It may sometimes develop when water, debris or other dirt gets into ear canal. Fungi give rise to a wide range of dramatic conditions that are difficult to manage. One such condition is Otitis externa or infection of outer ear canal.

Often the source of the mycotic infection is unknown. Also it is well known, that the fungus can remain in the ear without producing any symptoms, but fungus is not a normal inhabitant of the external ear canal. As long as the fungus is on the cerumen or wax and has not invaded the lining of the ear, it is asymptomatic [1].

Diabetes is an immunocompromised state and it increases susceptibility to various types of infections. Not all types of fungal infections occur frequently in diabetics. The majority of diabetic patients, particularly who have well-controlled diabetics, are at no increased risk for acquiring a fungal infection of external ear canal.

In previous studies it is evident world wide that diabetes mellitus patients exhibit particular susceptibility to three severe infections of the head and neck- Rhinocerebral Mucormycosis, Postoperative endophthalmitis and Malignant Otitis externa.

Rhinocerebral Mucormycosis is an extensive life-threatening infection beginning in the nose and paranasal sinuses and extending often into the orbit and the brain. Endophthalmitis, which is infection of the vitreal contents, can occur secondary to bacteremia, trauma with or without diabetes mellitus. Invasive or Malignant Otitis externa is an invasive infection beginning in the soft tissue of external auditory canal and into bone. It is usually due to infection by Pseudomonas aeruginosa and occurs almost exclusively in diabetics. Notably Mucocutaneous candidiasis is definitely increased in prevalence in diabetic patients.

People in immunocompromised state like in Diabetes or debilitated people, people suffering from malnutrition are increasingly supposed to be susceptible to Otitis externa [2]. Among Diabetic patients most people who suffered from Otitis externa, Aspergillus and candida species were most frequently involved. Slow growing fungi might be missed as we had limited special detection techniques in our peripheral

health institute [3].

MATERIALS AND METHODS

This is a prospective study conducted in six months in 2019-2020 at a peripheral health institute. A total of 50 suspected cases of Otitis externa or infection of external ear canal resembling fungal etiology among Type 2 Diabetes mellitus patients were diagnosed clinically by noticing features using otoscopy and physical examination and samples from external ear canal are collected. Swabs were sent to microbiology lab immediately. Other Clinical related details such as history, any history of previous surgeries, trauma, antibiotic usage, and regarding diabetic medications were taken. General Physical examination was done and also thorough ear examination was done.

Informed consent was taken from patient. The specimen debris from the external auditory canal was taken after cleaning the ear. The collected debris was used for direct microscopy and was sent for fungal culture on Sabourads dextrose agar (S.D.A.) and Corn meal agar. Direct Microscopy was done to see any fungal elements in direct smear using KOH stain. All the samples collected were processed by inoculating into Sabourads Dextrose Agar slants to see growth of fungal elements. When the growth came the characteristics of colony were noted and processed through Slide culture technique using Corn meal Agar, to know the exact morphology and hence species of fungus. Further in detail structure of fungi was also noted down by doing Lacto Phenol Cotton Blue stain of growth on Slide culture [4].

RESULTS

Out of 50 suspected cases of Mycotic Otitis externa, 38(76%) were positive for fungal elements. Among 38 of the culture positive samples, 33(66%) were positive for both microscopy and culture. 5 (10%) were positive for microscopy and were negative for culture (Table No.1).

The fungi isolated by doing culture on Sabourads Dextrose Agar and are depicted in table no.2

Species identification of candida was done by Dalmau technique using corn meal agar, exact morphology was studied by noticing Yeast cells, chlamydospores, elements of Hyphae. For identification of Candida albicans Reynaulds Braude phenomenon was used.

Table 1: comparative study of culture and microscopy of suspected Otitis externa cases

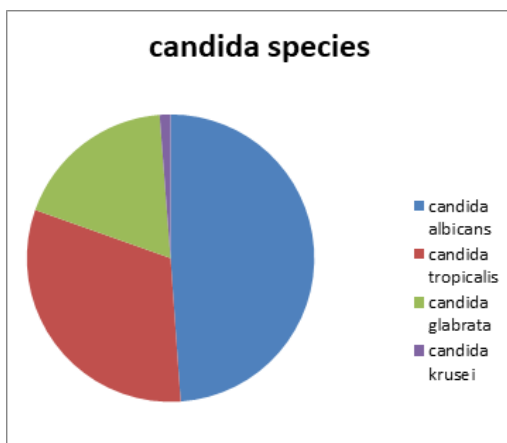
Microscopy	38
Culture	33
Microscopically detected Culture negative	05

Table 2: Various fungi isolated

S. No.	Name of the Fungus isolated	No. of cases isolated	Percentage
1	Candida species	21	42 %
2	Aspergillus species	11	22%
3	Rhizopus oryzae	10	20%
4	Mucor racemosus	2	4%
5	Septate hyphae unidentified	1	2%
6	Paecilomyces lilanicus	0	0%

Many patients had mixed infection.

Fig. 2: representation of various species of Candida isolated.



Candida albicans was most common pathogen isolated about 48% followed by candida tropicalis (31%), Candida glabrata (18%), Candida krusei(3%).

Males were most commonly affected about 61% when compared to females. Among out of 50 cases, most commonly affected age group was 40-60 years about 75%.

The study also depicted that highest incidence of fungal infection occurred in the rainy season when humidity is quite high and the lowest incidence occurred in summer season .This may be attributed to finding that humidity in summers is very low.

Table 4: Showing symptoms of Otitis externa

Clinical feature	No. of cases observed
Itching	42
Pain	22
Discharge from ear	18
Impaired hearing	12

The patients presented with varying symptoms like pain, itching, discharge from ear, impaired hearing. most of the patients had multiple symptoms.

DISCUSSION

Diabetes mellitus as a immunocompromised state is a major predisposing factor for many fungal infections, genitourinary infections, lower respiratory tract infections, oral infections, skin and mucous membrane infections, ear infections. Fungal infections need early diagnosis so that prompt treatment may be started early. Fungal infections are leading to serious morbidity and mortality to the patients.

Type 1 as well as type 2 Diabetes Mellitus patients are more prone to infections. Muller LMAJ *et al.*; [5] also documented in a similar study that both DM1 and DM2 patients are at increased risk for bacterial skin and mucous membrane infections and mucous membrane infections.

50 were suspected cases of fungal Otitis externa among diabetes type 2 patients who consent for study and samples collected .Out of which 38(76%) were positive for fungal elements. Several similar studies observed that skin and mucous membrane infections are common in patients with Diabetes [6, 7,8]. Muller LMAJ *et al.*; [5] mentioned that Otitis externa or infection of external auditory canal was one of the main infections in this group.

In our study most commonly isolated fungi in this study was Candida species (42%) followed by Aspergillus species (22%) and Rhizopus oryzae (20%). Candida albicans (48%) was most common among candida species. Our study depicted that highest incidence of fungal infection occurred in the rainy season when the atmospheric humidity is high and the lowest incidence occurred in summer season, when the atmospheric humidity is low. In our study maximum of patients complained of pain associated with itching. Most of the patients presented with multiple symptoms simultaneously. Early and prompt diagnosis of the exact fungal etiology is very important. As it would decrease unnecessary usage of antibiotics.

CONCLUSION

In our study we concluded that fungal culture is highly beneficial for diagnosing otitis externa. Diabetes is an immune-compromised state and it increases susceptibility to various types of infections. Early and prompt diagnosis would decrease misuse of antibiotics and also unnecessary hospital stay.

REFERENCES

1. Laxmipathi G, Murthi RB; Ootomycosis J. Indian Med Assoc., 1960;34:439-41.
2. Yassin A, Maher A, Moawad MK; Ootomycosis, a survey in the eastern province of Saudi Arabia. J. Laryngotol., 92:869-76.
3. Baxter M; Proceed of the 8th congress of the International society of human and animal mycology. 1982.
4. Baron EJ, Peterson LR, finegold SM; Bailey and Scott's Daignostic Microbiology. Mosby; 1994.
5. Muller LMAJ, Gorter KJ, Hak E, Goudzwaard WL, Schellevis FG, Hoepelman Aim, *et al.*; Increased risk of common infections in Patients with Type 1 and Type 2 Diabetes Mellitus. CID, 2005; 41:281-8.
6. Shah BR, Hux JE; Quantifying the risk of infectious diseases for people with diabetes. Diabetes care, 2003; 26:510-3.
7. Walters DP, Gatling W, Mullee MA, Hill RD; The distribution and severity of diabetic foot disease: a community study with comparison to a non- diabetic group. Diabetic Med, 1992; 9:354.
8. Yosipovitch G, Hodak E, Vardi P, Shraga I, Karp M, Sprecher E, *et al.*; The prevalence of cutaneous manifestations in IDDM patients and their association with diabetes risk factors and microvascular complications. Diabetes care, 1998; 21(4):906-9.