



## INCIDENCE OF MALIGNANT OTITIS EXTERNA AMONG TYPE 2 DIABETES MELLITUS PATIENTS IN A TERTIARY CARE HOSPITAL

### Otolaryngology

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### ABSTRACT

**Introduction:** Malignant Otitis Externa(MOE) is an aggressively spreading, serious life threatening inflammation. It is an invasive infection of the base of the skull having its origin from the external auditory meatus. Diabetes mellitus increases the susceptibility of the affected individuals to the infectious diseases.

**Aim:** To evaluate the incidence of malignant otitis externa among Type 2 diabetes mellitus patients.

**Methodology:** N=205. All patients underwent same protocol. Convenience sampling was done. Incidence rate, common organisms / sensitivity pattern, sugar levels were compared and correlated. Our participants presented with MOE at an incidence rate of 38.3%. Observed values were discussed and compared with similar studies.

**Conclusion:** MOE is quite prevalent and has a potential for mortality if timely measures are not available.

### KEYWORDS

Malignant otitis externa, incidence, type 2 diabetes mellitus, culture-sensitivity

### INTRODUCTION:

Malignant Otitis Externa (MOE) is an aggressively spreading, serious life threatening inflammation. It is an invasive infection of the base of the skull(1), having its origin from the external auditory meatus. The most common causative organism is *Pseudomonas aeruginosa*. The prevalence of the infection is very high among individuals with uncontrolled type 2 diabetes mellitus [T2DM](2). The term "Malignant External Otitis", was coined and the clinical features of the disease was specifically described by Toulmouche in 1838(3). The characteristic features of the disease are excruciating ear pain more at night, otorrhoea & loss of hearing(4). There is associated facial paralysis in 50% of the individuals(5).

Surgical management is very much limited with mortality rate around 50%(2, 6). The main factors that help in improved outcome in the treatment are higher dosage of culture directed aggressive parenteral antibiotics, local debridement and strict glycemic control(7, 8). There were also reports of fungal colonies causing the condition(1). There should be modifications in the management protocol according to the conditions of the individual patient(9, 10).

### Aim:

To evaluate the incidence of malignant otitis externa among Type 2 diabetes mellitus patients.

### MATERIALS AND METHODS:

This was retrospective and prospective study. Study population included T2DM patients (hospital). Study duration was for 3 months from Jan 2019 to March 2019. Sample Size (n) = 205 (171 old + 34 new). Convenient sampling technique.

### Inclusion criteria:

1. Type 2 diabetes mellitus patients
2. Age > 18 years

### Exclusion criteria:

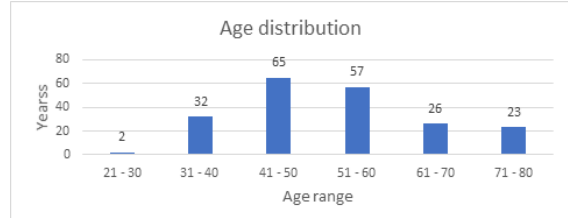
1. Type 1 diabetes mellitus
2. Gestational diabetes
3. Other immune-compromised individuals

Thorough ENT clinical examination was done to document MOE. Ear swab from the external auditory canal was collected from both the ears of the patient. The socio-demographic details of the patients, including age, sex, and duration of disease and glycemic status were noted. All patients underwent diabetic work up with temporal bone radiology. Ethical clearance from the Institutional Review Board (IRB) and Institutional Ethics Committee (IEC) was obtained. Written informed consent was obtained. Risk of exposure to ionizing radiation was explained to patients and were assured that it was necessary and a one-time exposure for the study.

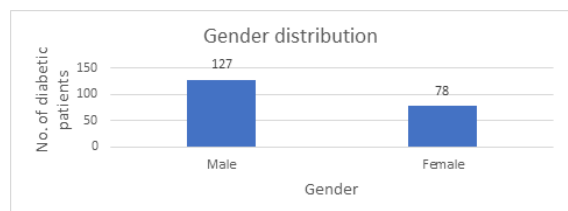
### Observation and Results:

**Table 1. Demographic details. \* - categorical and continuous data**

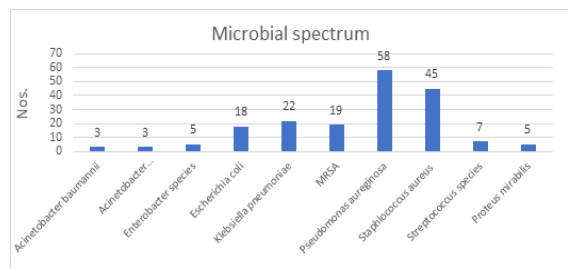
Sr. No.	Parameters	Values*
1	Age range (years)	30 – 78
2	Mean age (years)	51.4 ± 13.8
3	Sex (Male: Female)	1.6:1
4	Duration range (years)	2 To 25
5	Mean Duration (years)	10.6 ± 5.5
6	Mean HbA1c (%)	7.7 ± 1.8
7	No. of ears (n)	205



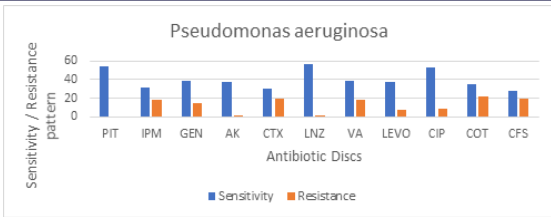
**Figure 1. Age distribution of patients with Type-2 Diabetes Mellitus**



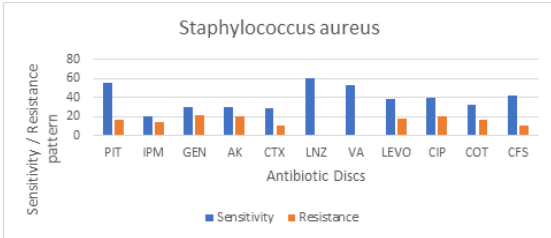
**Figure 2. Gender distribution of patients with Type-2 Diabetes Mellitus**



**Figure 3. Microbial spectrum of the cultured organisms obtained from the ear swab of patients with Type-2 Diabetes Mellitus**



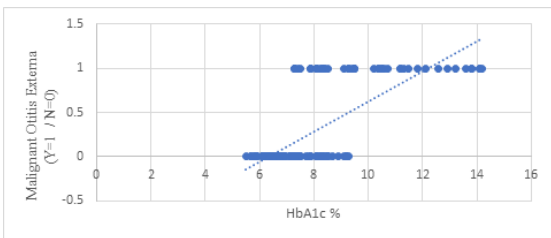
**Figure 4. Antibiotic sensitivity Pattern of Pseudomonas aeruginosa isolated on culture in patients with Type-2 Diabetes Mellitus**



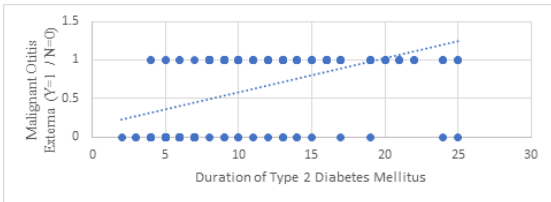
**Figure 5. Antibiotic sensitivity Pattern of Staphylococcus aureus isolated on culture in patients with Type-2 Diabetes Mellitus**

**Table 2. Correlation values**

Correlations		
	Parameter	MOE
T2DM duration	Pearson Correlation	.492 <sup>**</sup>
	Sig. (2-tailed)	.001
	N	205
HbA1c	Pearson Correlation	.699 <sup>**</sup>
	Sig. (2-tailed)	.001
	N	205



**Figure 6. Correlation between HbA1c and malignant otitis externa**



**Figure 7. Correlation between Duration of Type 2 diabetes mellitus and malignant otitis externa**

**DISCUSSION:**

205(n) patients with T2DM were treated during the study period (Table 1, Fig. 1, 2) however another study by Cheng Y. et al. had a sample size of 773(15). Our participants presented with MOE at an incidence rate of 38.3% compared to other studies(15). The incidence of the disease attains peak in the age group of 41-50 years as compared to other studies(11,12). Mean age was 51.4 ± 13.8 as compared to 62.8 ± 18.0 years(15). A male preponderance was noted in our study as compared to a similar study. The mean duration of disease was 10.6 ± 5.5 years and the mean glycosylated hemoglobin was 7.7 ± 1.8%. The mean fasting and post-prandial sugar levels were 274.33 ± 24.54 mg/dl and 311.42 ± 27.12 mg/dl respectively.

The most common organism isolated in the culture was Pseudomonas aeruginosa (28.29%). The next common organism found was

Staphylococcus aureus (21.95%) (Fig. 3, 4 and 5). This was in accordance with the results of the study conducted by other authors, reinforcing the major contribution of Pseudomonas aeruginosa in causing MOE. Other bacterial organisms such as Klebsiella pneumoniae, Acinetobacter baumannii, Acinetobacter haemolyticus, Enterobacter species, Escherichia coli, Streptococcus species, Proteus mirabilis were grown from the culture.

The major approach of treatment to this infectious disease was by medical management. To control its progression, strict glycaemic control is extremely essential. The treatment of choice for this condition in the past was oral ciprofloxacin(13). Irrational use of ciprofloxacin could have led to the increase in the number of resistant cases to the drug. The other drugs that we tested were Linezolid, Piperacillin-Tazobactam, and Vancomycin, etc. The diabetic patients are at risk of compromised renal functions. Hence, careful monitoring of nephrotoxicity and ototoxicity needs to be maintained while administering aminoglycosides for treatment. The role of surgery is very much limited in case of MOE in our study. Mastoidectomy may be required in seriously infected cases. After complete treatment of MOE, recurrence of the disease is common(14).

The correlation between MOE and duration of T2DM, and HbA1c values was evaluated (Table 2, Fig. 6 & 7). Correlation co-efficient was 0.462 and 0.699 respectively, which showed a mild to moderate positive correlation. The HbA1c levels were a better tool than duration of disease to predict possibility of acquiring MOE and might also help with prognostic value. Sample size was a weighted limiting factor. A larger sample would definitely reduce chances of over-/under-estimation of incidence.

**CONCLUSION:**

Patients with T2DM should be made aware of the “malignant otitis media” entity atleast during their routine blood sugar level check-ups. Advising a parallel otologic examination would be wise and help prevent such occurrences at early stages. Early signs of earache, canal edema or symptoms of ear discomfort/discharge with a history of habitual ear fiddling must raise suspicion of MOE, thus preventing advances like necrotizing otitis externa or skull-base osteomyelitis. With good ear care, the incidence can surely be brought down.

**Conflict of Interest – None.**

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