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A Clinical Study on Malignant otitis externa

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Abstract

Background

Malignant otitis externa is a infective condition of the ear, where the morality rate is very high if not treated promptly. Its not a malignant disease. But the name is malignant because of high mortality rate in the past. It is found most commonly in the uncontrolled diabetic patient and in the patient with low immunity status. It needs prompt management planning in the form of investigation, medical and surgical treatment. In the present study we have shown different types of treatment and prognosis in our set up.

Materials and methods

- *Study design – Retrospective study*
- *Study setting – Study has been conducted in the department of Ear, Nose and Throat (ENT), in a tertiary care hospital of south India.*
- *Study period - 3 years*
- *Target population – ENT outpatient department (OPD) and inpatient department (IPD).*
- *Sample size – 22*
- *Sampling criteria – All the diagnosed patients of malignant otitis externa during above said period were taken for study.*
- *Methodology - Data were collected from the medical education department and analyzed.*

Results and conclusion

In the present study

- *Out of 22 cases, 18 were male and 4 were female.*
- *Most common age group of involvement is 60-70 years.*
- *Commonest presentation is otalgia and commonest finding is granulation in the external ear canal.*
- *Commonest organism is Pseudomonas aeruginosa.*
- *Surgical treatment was done in 36.36 percent cases.*
- *Death rate is 9.09 percent.*

So in conclusion, malignant otitis externa is a aggressive disease and it should be treated as early as possible to prevent further complication and death.

Key words: *Malignant otitis externa, Necrotising otitis externa, Skull base osteomyelitis, Pseudomonas*

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I. Introduction

Malignant otitis externa (MOE) is an aggressive and potentially life threatening infection of the soft tissue of the external ear and surrounding structures, quickly spreading to involve the periosteum and bone of the skull base. The name given is a misnomer, because it is not a malignant disease, rather an infectious condition. It can also be called as 'necrotizing otitis externa' and 'skull base osteomyelitis'. It is common in immunocompromised patients like elderly diabetics, HIV/AIDS, myeloid malignancies, anti cancerous drugs and organ transplant recipients [1]. As per literature states that, first case of malignant otitis externa was reported in 1836 [2]. Malignant external otitis has been named because of its high mortality rate .

Pathologically, disease starts with cellulitis, progress to chondrites, then to periostitis and finally to osteitis. It mainly affect the Haversian system of compact bone. Involvement of the pneumatized bone is late. Bacteriologically, most common organism is pseudomonas aeruginosa in 95% cases. Sometime other organism are also found involved like aspargillus and gram positive and negative bacterias.

Usual predisposing factor for malignant otitis externa is elderly uncontrolled diabetes. In non-diabetics the organism is usually aspargillus. Some times it is found in children i.e. children with acquired immune deficiency syndrome (AIDS) and malignant histiocytosis. Patients of malignant otitis externa usually present with severe pain in the ear more at night and ear discharge. These symptoms, if resistant to local treatment for 8-10 days, is highly suspicious of malignant otitis externa. On clinical examination the findings are granulation tissue in the external canal and edema. Diagnosis is done mainly by clinical examination. It can be confirmed by pseudomonas in culture, positive bone scan and cranial nerve palsy.

Tc 99 scan is more sensitive than CT scan for identification of bone destruction. Magnetic resonance imaging (MRI) scan is useful for identification of soft tissue involvement and extension. Ga 67 is useful to identify the infectious tissue.

Clinico-pathological classification system is to be used for staging the disease. This helps to plan the treatment protocol and to expect the prognosis.

Management includes aural toilet, but use of the topical antibiotic is controversial. Anti-pseudomonial antibiotics like ciprofloxacin, aminoglycosides and ceftadizim is to be started systemically for at least 6 week and an be continued for several months in advance cases. Role of hyperbaric oxygen therapy is not clear.

Surgery in malignant otitis externa is reserved for only few selected cases . Removal of sequestra, pus, narcotized tissue, granulation tissue is beneficial. But it should be only used if the patient is deteriorating clinically and if definable surgical goal can be easily achieved.

There is a wide spread agreement that surgical intervention for malignant otitis externa should be reserved for a few selected cases and no longer has a goal of removing all the infected tissue. The overall mortality rate in the past was 46%. But now after invention of broad spectrum antibiotics it has been reduced to 10%. But the prognosis is bad and mortality rate is 80% when patients present with cranial nerve palsy. Commonest cranial nerve involves is facial nerve, in 60% cases. Other cranial nerves like IX, X and XI are involved some times and rarely VI and XII cranial nerves are involved.

The objectives of our study are 1) study the clinical profile and treatment protocol in malignant otitis externa 2) study the outcome of treatment in out setting.

II. Materials and methods

Study design – Retrospective study
Study setting – Study has been conducted in the department of Ear, Nose and Throat (ENT), in a tertiary care hospital of south India.
Study period - Over a period of 3 years (From January 2016 to December 2018)
Target population – Patients were selected from ENT outpatient department (OPD).
Sample size – 22 cases of malignant otitis externa.
Sampling criteria – All the diagnosed patients of malignant otitis externa during above said period were taken for study.

Inclusion criteria –

- Patients of all age group and all sexes who have already been diagnosed to be malignant otitis externa.
- Patients taken full treatment in our hospital
- Patients came for regular follow up.
- All the relevant data are available in the medical record department.

Exclusion criteria –

- Patients where diagnosis is doubtful.
- Not taken full treatment in our hospital
- Patient lost follow up
- All the relevant data are not available in the medical record department.

Procedure Methodology - Data for the present study was collected from the medical record department of our hospital. All the patients during the period January 2016 to December 2018, who has been diagnosed to have malignant otitis externa were taken for the study. Personal data, clinical presentations, findings, diagnosis, treatment and prognosis were collected from the patient case sheets and analyzed. Diagnosis of the malignant otitis externa was found to be established according to the following criteria. 1) persistent otalgia and otorrhea for more than 10 days despite receiving routine otitis externa treatment, 2) presence of external auditory canal granulations or edema, 3) concurrent diabetes or a immunocompromised state, 4) isolation of the causative organism of MOE like Pseudomonas aeruginosa, Streptococcus aurius, candida etc from the exudate, 5) high resolution CT scan showing soft tissue changes and bone erosions in the external auditory canal, with extension to skull base and adjacent structures.

Clinico-pathological classification system was used for staging the disease. Table - 1 shows the staging of malignant otitis externa.

Table - 1 (Clinico-pathological classification system) [2]

Stage	Pathology
Stage - I	Infection of the soft tissue beyond the external canal. No bone involvement on Tc 99 scan.
Stage - II	Infection of the soft tissue beyond the external canal. Bone involvement on Tc 99 scan.
Stage - III (a, b)	Cranial nerve palsy a) Single cranial nerve palsy b) Multiple cranial nerve palsy
Stage - IV	With meningitis, empyema, sinus thrombosis, brain abscess

All the patients were treated with intravenous antibiotics as per culture and sensitivity test for 3 - 4 weeks. Local treatments was given with local packing of the medicated wick using mupirocin ointment daily. Surgical treatment was done in only those patients who suffered persistent otalgia for more than 10 days despite treatment and those with persistent granulations with or without facial nerve or other cranial nerve palsy. Neurosurgical consultation was done for those with cranial nerve palsy and intracranial complications and treated accordingly. Diabetes was treated effectively by insulin and diet modification as advised by dietician. Those patients treated successfully and discharged were followed up every monthly for a period of 1 year.

III. Results

During the period January 2016 to December 2018 (3 years) total number of patients attended our ENT OPD were 37896. And total number of patients admitted to the ward were 1640. Out of these 22 cases were diagnosed as malignant otitis media.

Out of 22 patients of MOE, 18 were male and 4 were female. So the male to female ratio is 4.5:1. All the patients in our series were in between age 40 to 70 years. Two patient were between 40 - 50 years, 2 patients between 50 - 60 years and rest 18 patients were between 60 - 70 years. Youngest patient in our series is 48 year and oldest is 69 year. Twenty one out of 22 patients are diabetics and one patient is non-diabetic. Out of all diabetic patients 16 were having uncontrolled diabetes and 5 having diabetes under control.

Table -2: Clinical presentations

Clinical features	Number	Percentage (%)
Otalgia	22	100
Ear discharge	18	81.8
Hearing loss	17	77.27

Clinical features	Number	Percentage (%)
Facial palsy	7	31.81
Other cranial nerve palsy and intracranial complications	2	9.09
Mass in the external canal (granulation)	22	100

Table -2, shows the clinical presentations of all the patients with MOE. Otalgia was the commonest symptom and was found in all the 20 cases (100%). Ear discharge was found in 18 patients (81.8%), hearing loss in17 patients (77.27%) and facial palsy in 7 cases (31.81%). Two cases we got intracranial and other cranial nerve involvement (9.09%). Commonest sign in the patients were external auditory canal granulation, found in all the 22 cases (100%) (Figure - 1).

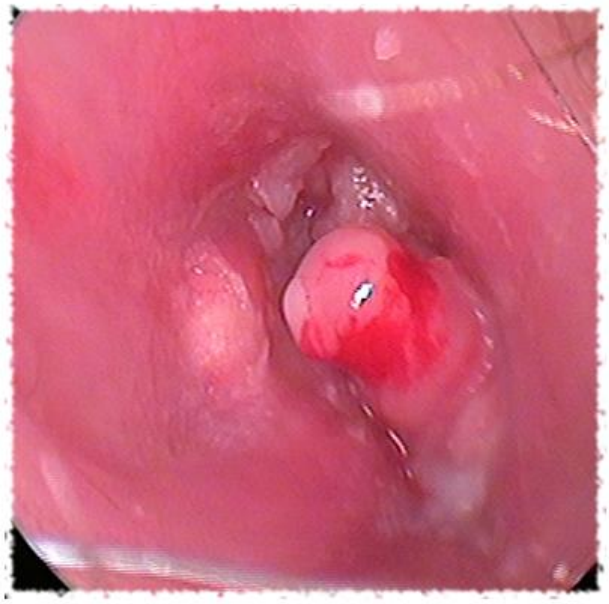

Figure - 1 : Granulation in the external auditory canal

Table -3, shows the organism found in the culture and sensitivity test of the ear discharge. Out of all the 22 patients only pseudomonas was found in 10 cases (45.45%), Pseudomonas and Staphylococcus was found in 5 cases (22.73%), Pseudomonas and Klebsiella was found in two cases (9.09%), Coagulase positive Staphylococcus was found in 3 cases (13.64%) and only Candida was found in 2 cases (9.09%). So it shows that Pseudomonas is the commonest organism found either alone or in combination, i.e. 17 cases (77.27%).
All the organisms were sensitive to the third generation cephalosporins like ceftazidime, cefoperazone and ceftriaxone as well as to ciprofloxacin.

Table - 3: Organism found in culture and sensitivity test

Organism	Number of patients	Percentage (%)
Only Pseudomonas	10	45.45
Pseudomonas + Staphylococcus	5	22.73
Pseudomonas + Kebsiella	2	9.09
Coagulase positive Staphylococcus	3	13.64
Candida	2	9.09

We did the staging for each patients as per clinics-pathological classification system (Table-1). We did not get any patient in stage -I. Ten patients were categorized as stage - II (45.45%), eight were as stage - IIIa (36.37%), two were as stage - IIIb (9.09%) and rest two (9.09%) were categorized as stage - IV.

CT scan was done in all the cases of MOE to identify the bone erosion and and extension of the disease. Almost all cases we got bone erosion. Three cases we got erosion of the lateral semicircular canal, one case superior semicircular canal and six cases erosion of the facial canal.

All the 22 cases were treated in our hospital. Systemic antibiotic was given to all the patients with culture and sensitivity test. Out of 22 cases 14 (63.63%) were managed by medical treatment including antibiotics, analgesic and local packing. For rest 8 cases (36.36%), surgical treatment was done. All the 8 cases we did debridement of the lesion and modified radical mastoidectomy under general anesthesia. Three cases facial nerve was decompressed.

Table - 4, shows the prognosis after treatment. Out of 22 cases, 14 recovered completely (63.64%) with out any complications and discharged with 2 month course of ciprofloxacin. Four patients (18.18%) developed sensory neural hearing loss, 2 patients (9.09%) had residual facial palsy and 2 patients (9.09%) died with intracranial complication (meningitis).

Table - 4 : Post-treament Prognosis

Prognosis	Number	Percentage (%)
Completely recovered	14	63.64
Sensorineural hearing loss	4	18.18
Residual facial palsy	2	9.09
Death	2	9.09

IV. Discussion

Malignant otitis externa is a life threatening infection of the external ear. It should be identified and treated as early as possible. History and clinical examination are most important in diagnosing the disease, with some investigations like culture and sensitivity test and CT scan of the temporal bone.

Lambor et al (2013), in a series of 27 cases shows that the usual age group of MOE is 50 - 80 years [6]. In our series we found the cases in between age 40 to 70 years. In our series there is male predominant i.e. male : female ratio is 4.5:1. This is also comparable with the study by Osama et al [7] and Ali at al [8].
Our study shows that, high incidence of malignant otitis media is found in diabetic patients and more commonly uncontrolled diabetics. This also proved by James Chandler [3]. In our study one patient was non-diabetic. The exact cause of malignant otitis externa in non-diabetics is unknown, but it could be associated with age related small vessel disease and altered immune function [9],[10].

Malignant otitis externa classically presents as otalgia, otorrhea and granulation in the external canal. The otalgia is deep, boring, throwing type and mainly nocturnal, which is resistant to analgesics. Review of the literature showed the otalgia to be most common presenting symptom with a incidence rate 75 - 100 percent [6][11]. In our study otalgia was found in 100% cases.

The most common sign in our study was granulation in the external auditory canal and was found in all the cases (100%). This is similar to the previous studies [3][8][10]. All the granulation tissues were sent for histopathological study to rule out malignancy, tuberculosis etc.

When disease progresses the cranial nerves are involved and sometimes there may be multiple cranial nerve involvement. In our series common cranial nerve was found to be involved is facial nerve (31.81% cases). Some literature also show that the involvement of the facial nerve is commonest [8][11].
Pseudomonas was the most common organism found in our study by culture and sensitivity test. It is a gram negative aerobic organism, has got capacity of selective vasculitis. O' Sullivan et al, described some strains of

pseudomonas which produce neurotoxin that are likely to play a role in the development of cranial neuropathy [12]. Second most common organism in our study was staphylococcus and we found candida in two cases.

High resolution CT scan is the preferred modality for identifying bone destruction and extension of the disease. CT scan can only detect the disease when at least 30 - 50 percent of bone erosion has already occurred [13]. In our series, CT scan we got 3 cases of dehiscent lateral semicircular canal, 1 case of superior semicircular canal and 6 cases of erosion of the facial canal.

The treatment of malignant otitis externa has always been controversial and several modification have been made to the therapeutic approach. Mono therapy has been successfully practiced; however the emerging resistance has demanded combination therapy [14]. It is widely accepted that the role of surgery in necrotising otitis externa is adjuvant or complementary. Surgery is indicated if the patient is deteriorating clinically, in spite of medical therapy [5]. In our series only 8 cases were treated surgically.

The mortality rate of the malignant otitis externa has been reported to be 23 percent in cases where no deep structure are involved, 67 percent if the facial nerve was involved and 80 percent if deep cranial nerves and jugular vein were involved as reported by Meyerhoff WL et al[4]. Lambor et al [6] shows that in their series of 27 cases mortality rate is 14.8 percent. In our series 63.64 percent cases recovered completely. The mortality rate is 9.09 percent i.e. two cases out of twenty two. Both the two cases were having intracranial complication. So, in the patients with intracranial complication, the death rate is 100% in our series.

V. Conclusion

So malignant otitis externa being an aggressive disease, should be diagnosed, evaluated and treated promptly to prevent complications and death. Complications are more when there is neural and intra cranial involvement.. Present study shows that with the prompt treatment also it is difficult to prevent death in malignant otitis externa in case of intracranial involvement.

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