

Malignant Otitis Externa in South West of Iran: An Epidemiological Investigation

MOZAFAR SARAFRAZ¹, SOMAYE HARAGHI^{2*} and NEGARIN NAZARI³

¹Associated Professor of Otolaryngology, Head and neck surgery, Hearing & Speech Research Centre, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

²Resident of otolaryngology, Head and neck surgery, Hearing and Speech Research Centre, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

³General physician, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

*Corresponding author E-mail :savesina@yahoo.com

<http://dx.doi.org/10.13005/bpj/913>

(Received: February 10, 2016; accepted: March 25, 2016)

ABSTRACT

Malignant otitis externa is an invasive infection which destroys the external ear canal and can develop and result in skull base osteomyelitis, meningitis and paralysis of the cranial nerves. This disease generally occurs in patients with primary or secondary immunodeficiency. In this regard, this research was planned in line with a complete and comprehensive investigation in relation to the epidemiological situation of this disease in Ahvaz Imam Khomeini hospital, as the main center of ear, nose and throat surgery in the South West of Iran. This research was carried out by studying the medical records of the patients with malignant otitis externa, referring to the ear, nose and throat ward of Ahvaz Imam Khomeini hospital between 2006 and 2012, and it was prepared and arranged in a checklist. This information included the patients' epidemiological information. 48.4% of the patients were men and 51.6% of the patients were women. The mean age was 55.14 years. The patients' most common etiology was diabetes, and the most common possible complication was facial nerve paralysis. The mean days of hospitalization for the patients was 19.51 days. This disease has a significant relationship with the patients' age and sex, and these two factors are predisposing to the disease. Also the etiology factor is the accelerating factor of the disease. This disease has a significant relationship with the occurring complication as well.

Key words: Malignant otitis externa, epidemiology, diabetes.

INTRODUCTION

Malignant otitis externa is an invasive infection which destroys the external ear canal and can develop and result in skull base osteomyelitis, meningitis and paralysis of the cranial nerves¹. This disease are generally observed in patients with primary or secondary immunodeficiency, including elderly diabetic patients (greater than 90%), patients with HIV, chronic leukemia, lymphoma, neoplasia, and patients who have undergone splenectomy, or chemotherapy and radiotherapy²⁻³. Incidence of this disease, although rare, but have

also been observed in children, that unlike in adults, are often associated with a weakened immune system on a background of malignancy or malnutrition⁴. The etiologic agent of malignant otitis externa has been almost always (98%) *Pseudomonas aeruginosa*, but other bacteria or fungal agents can also rarely lead to the disease, (2 and 3) while some decades have passed since the detection of this disease, but little information is available about its pathophysiology. The most common pathological finding is vasculitis associated with thrombosis and necrosis of the surrounding tissue, which occurs due to bacterial

invasion into the arterial wall. Exposure to water, such as washing cerumen, swimming, an increase in the PH of cerumen and microangiopathies in diabetic patients are proposed as predisposing factors of malignant otitis externa. Usually, the infection is originated from the outer ear canal, and then spreads through natural fissures, venous channels, and facial junctions, which can affect anatomical structures such as the parotid gland, sub-temporal fossa, and mandibulo-temporal and skull base areas. Bone destruction and the progressive spread of the infection towards the holes of the skull base will lead to cranial neuropathy. Meningitis and brain abscesses occur following the spread of the infection towards the sigmoid sinus, and ultimately the infectious thrombosis of this sinus and the internal jugular vein⁵. This disease is more prevalent in men than in women⁶ and its clinical manifestations are in the form of sustained severe pain, ear fullness, purulent otorrhea, and hearing loss³. Hearing loss due to ear blockage is usually of the transitional type, and if it is associated with sensorineural hearing loss or dizziness, indicates involvement of the labyrinth, and is an advanced invasive lesion⁶. Its diagnosis requires high suspicion, various experiments, and various radiologic studies³. Systemic anti-pseudomonas antibiotics are the main components of the treatment of this disease, and topical treatments have no place in the recovery process. Beta-lactams and oral ciprofloxacin are among systemic antibiotics which are used. Although extensive surgical treatments were considered necessary before the advent of antibiotics, surgeries are currently limited to diagnostic methods and debridement of necrotic tissues of the ear canal. Some experts use Hyperbaric Oxygen as adjuvant therapy in refractory cases, but its effect has not been certainly proved⁴⁻⁵.

Epidemiological studies of diagnosis and treatment of diseases and adopting treatment management solutions play the prime role, which leads to achieving the age, gender, racial, economic and cultural pattern in one region, and focuses the minds on specific target groups, to reduce disabilities and imposed economic costs, by precise planning for screening and early diagnosis and treatment. Since malignant otitis externa is considered one of high mortality diseases, therefore

comprehensive epidemiological information should be available about it in each region, so that on-time diagnoses and proper treatments can be adopted for the patients, based on the frequency of the disease and the related etiologies,. The importance of this issue made us investigate the frequency, etiology, length of hospitalization, and possible complications of the cases with malignant otitis externa referring to Ahvaz Imam Khomeini teaching hospital, by designing a descriptive epidemiological study, It is hoped that this plan is a step towards providing epidemiological statistics and a basis for further complementary studies.

METHOD

The study conducted is a descriptive analytic epidemiological study based on hospital information. Accordingly the records available in the archive of the ear, nose and throat ward of Ahvaz Imam Khomeini hospital were examined, and eventually 93 medical records related to malignant otitis externa from 2006 to 2012 were investigated. After studying the medical records of the population under research, a checklist was set up based on age, gender, etiology, possible complications, and length of hospitalization, and the above mentioned information was included in the checklists, and then in order to analyze, first the intended variables were described using descriptive statistical methods, including frequency distribution tables, diagrams, and numeric indicators, and then in order to find the relationship between the variables, Chi-square and logistic regression tests were used. The significance level for the above tests was set to be 0.05, and SPSS software was used for data analysis.

RESULTS

This study has dealt with investigating the frequency of the patients with malignant otitis externa, hospitalized in the ENT ward of Ahvaz Imam Khomeini hospital. The total number of the patients with malignant otitis externa between 2006 and 2012 was 93 patients whose mean age in the present study was 55.14 ± 2.096 (3-88) years. (Diagram 1 and Table 1) there is a significant relationship between the patients' age and malignant otitis externa. $P = 0.001$

45 patients were men (48.4%), and 48 patients were women (51.6%). There is no significant relationship between the patients' gender and malignant otitis externa. $P = 0.07$

There is a significant relationship between the patients' underlying etiology and malignant otitis externa. $P = 0.03$ (Diagram 2)

There is a significant relationship between the patients' possible complications and malignant otitis externa. $P = 0.001$ (Table 2)

There is a significant relationship between possible complications and the patients' etiology. $P = 0.5$

The duration of hospitalization was 19.51 ± 1.46 (2-49) days, hence there is no significant relationship between the patients' duration of hospitalization and malignant otitis externa. $P = 0.2$

Table 1: The frequency of the patients based on age deciles

Percent	Frequency	Age group
3.2	3	0-10
4.3	4	20-Nov
5.4	5	21-30
9.7	9	31-40
12.9	12	41-50
26.9	25	51-60
18.3	17	61-70
8.6	8	71-80
10.8	10	81-90
100	93	total

Table 2: The frequency of the patients based on possible complications

Percent	Frequency	
75.38	49	Facial nerve palsy
20	13	Other cranial nerve palsy
4.6	3	Skull osteomyelitis and necrosis
100	65	total

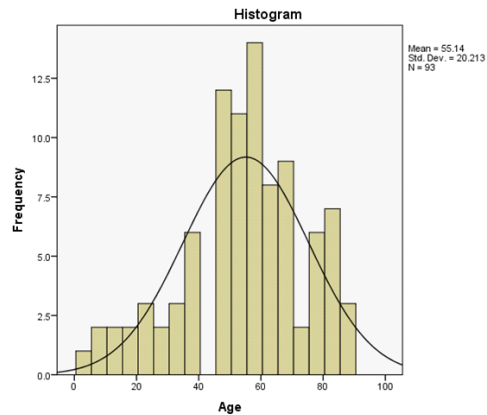


Diagram 1: The frequency of the patients' age

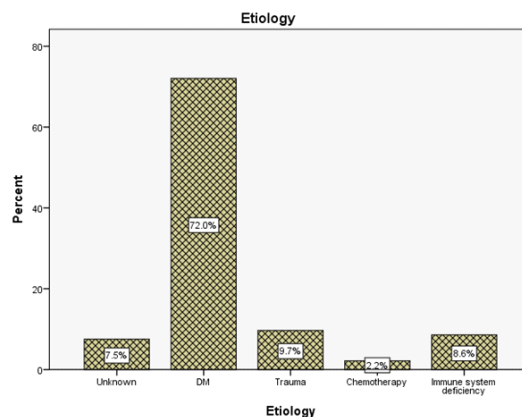


Diagram 2: The frequency of the patients based on etiology

DISCUSSION

In this study, the patients' mean age was 55.14 years, and most patients were ranging in age from 51 to 60 years with 26.9 percent, followed by 61 to 70 years with 18.3 percent. Thus the result is that this disease is more common in older ages and above middle age, and as age increases the incidence of this disease goes higher based on its risk factors. This is consistent with Migirov's study⁷ as well as with Zhandry's study¹³. They had concluded that the prevalence of the disease is higher in older people.

The significant relationship found in this study between the age and malignant otitis externa, confirms the above result. Therefore as age

increases the incidence and prevalence of malignant otitis externa increases.

In this study, 48.4% of the patients were men and 51.6% of the patients were women. It can be seen that the ratios of men and women patients are almost equal in this disease, and no priority can be seen in either of them. Thus according to the insignificant relationship found between the gender and malignant otitis externa, it can be said that the prevalence of this disease is irrespective of the patients' gender. This means that the patients' gender has had no effect on the incidence of their disease by its risk factors. This result is not consistent with Kar-Fai's study³. There was a higher rate of men than women with a ratio of 2 to 1 in the prevalence of the disease, in that study. This lack of consistency can be due to the situation of referrals to clinics and hospitalization conditions, which have caused disorders in frequencies.

In this study, the majority of patients have had the underlying disease of diabetes. This result shows that diabetes is a common factor in the incidence of malignant otitis externa in the patients. Trauma, infection due to a weakened immune system and chemotherapy were other causes of the disease, in order of frequency. Considering the relationship between the underlying etiology and malignant otitis externa and the prevalence rate, diabetes plays a major role in these patients' disease, and by appropriate control, screening and follow-up, the incidence of such cases should be

prevented or at least their intensity should be reduced. This result is consistent with Doroghazi's study¹², who considered diabetes to be the common etiology of malignant otitis externa disease. Also the results of this study is consistent with that of Doroghazi's study⁸, so that the infection caused by a lack of a strong immune system and its weakness can play a major role in the incidence of malignant otitis externa.

In this study, the majority of patients had the possible complications related to facial and cranial nerve paralysis. The relationship between the possible complications and malignant otitis externa is also significant, thus the complications are directly related to the disease conditions. This result is consistent with Naveen's study¹¹ as well as with Aly's study¹⁰. However, in the mean time, cases of rarer complications of skull osteomyelitis and necrosis had also been observed, about which no certain information was available.

The mean length of the patients' duration of hospitalization has been approximately 20 days which has varied in the range of 2 to 49 days. There is no significant relationship between the patients' duration of hospitalization and malignant otitis externa, thus, this length of hospitalization is not necessarily related to malignant otitis externa disease itself, but includes other factors of the patient's conditions as well, which need to be investigated more specifically.

REFERENCES

1. Yamazaki H and et al. Two cases of intractable malignant external otitis with skull base osteomyelitis alleviated by intraarterial antibiotic administration. *Nihon Jibiinkoka Gakkai Kaiho.* **113**(11): 851-5 (2010).
2. Waldemar Narozny and et al. Value of hyperbaric oxygen in bacterial and fungal malignant external otitis treatment. *Ear arch otorhinolaryngial.* **263**(7): 680-684 (2006)
3. Matthew J. Carfrae, Bradley W. Kesser. Malignant Otitis Externa. *Otolaryngologic Clinics of North America.* **41**(3): 537-549 (2008)
4. Jennifer rubin and etal. The changing face of malignant external otitis: clinical, radiological, and anatomic correlations. *The lancet infectious disease.* **4**: 34-39 (2004)
5. Po yuliu, zhiyuanshie, waynehuey. Malignant otitis externa in patients with diabetes mellitus. *Formos J endocrinmetab.* **3**(1): 7-13 (2012).
6. Naiimi m, ghasemi m, arabkhani r. study of malignant tumors of the external and middle ear and their treatments in ghaem hospital, mashhad, Iran. *Jondishapour Medical Journal.*, **10**(37): 37-43 (2011).
7. Martel J and et al. Malignant or necrotizing otitis externa: experience in 22 cases. *Ann*

- Otolaryngol Chir Cervicofac.* **117**(5): 291 (2000).
8. Lela Migirov and et al. Is laterality of malignant otitis externa related to handedness. *Medical Hypotheses.*, **81**(1): 142-143 (2013)
 9. Joshua, Ben Zion and et al. Predicting Outcome of Malignant External Otitis. *Otology & Neurotology.* **29**(3): 339-343 (2008).
 10. T Ali and et al. Malignant otitis externa: case series. *The Journal of Laryngology & Otology.* **124**(8): 846-851 (2010).
 11. Navin Mani MRCS, Holger Sudhoff, Sandeep Rajagopal. Cranial Nerve Involvement in Malignant External Otitis: Implications for Clinical Outcome. *The Laryngoscope.*, **117**(5): 907–910 (2007).
 12. Robert M. Doroghazi. Invasive external otitis: Report of 21 cases and review of the literature. *The American Journal of Medicine.* **71**(4): 603–614 (1981)
 13. Dhandray S, Karki P, Sinha BK. Malignant otitis externa: a review. *Pacific Health Dialog.* **9**(1):64-67 (2002).