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STUDY ON FACTORS PREDICTING PROGNOSIS OF MALIGNANT OTITIS EXTERNA IN A TERTIARY CARE CENTRE

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ABSTRACT

Malignant External Otitis is an aggressive infection primarily affecting elderly diabetic patients. It begins in the external ear canal and spreads to adjacent structures. This study investigated the clinical characteristics of patients diagnosed and treated for MOE and analysed factors affecting patient outcomes. This study was conducted on 80 patients with MOE admitted in the Department of ENT, Government Medical College, Trivandrum over a period of 6 years. Mean age of the patients was 65 years. 72% were males. All of the patients had diabetes mellitus. Pseudomonas aeruginosa was isolated in 42.5% cultures. All patients were treated with IV antibiotics and 5% had surgery. Duration of diabetes, Associated comorbidities and Extent of disease in CT scan were found to influence the prognosis of MOE. But prognosis was unrelated to age, complications of diabetes, microbiological profile or cranial nerve palsy. No factor related to treatment modality was correlated to prognosis such as medical treatment, surgery or interval to first appropriate treatment.

KEYWORDS

Malignant Otitis Externa, Prognosis

INTRODUCTION

Malignant external otitis (MOE) also known as skull base osteomyelitis, is an infection of external auditory canal that spreads to skull base and temporal bone. The disease is potentially lethal if not properly treated.-cranial nerves, venous sinuses, meninges and brain parenchyma may be involved. It occurs almost exclusively in elderly, diabetic patients or immunocompromised patients Medical treatment is the mainstay of therapy.

Considering the significant number of MOE cases referred to our centre and the variable response to treatment, this study was conducted to evaluate the clinical ,response to treatment and the factors predicting prognosis in MOE.

MATERIALS AND METHODS

The computerized data base of Govt Medical College Trivandrum, was retrospectively reviewed for all patients admitted for MOE between March 2013 to March 2019.

Levenson's criteria for diagnosis of malignant otitis externa:

- ·Refractory otitis externa
- ·Severe nocturnal otalgia
- ·Purulent otorrhoea
- ·Granulation tissue in the external canal
- ·Growth of Pseudomonas aeruginosa from external canal
- ·Presence of diabetes and and other immunocompromised states

According to our hospital protocol, HRCT Temporal bone was done to identify disease spread .Patients undergo biopsy for histological confirmation of inflammation and to exclude squamous cell carcinoma. Antibiotics are prescribed for 6 weeks. Follow up examinations ,CRP and ESR measurements are repeated.

STAGING OF MOE (corey et al 1985)

Stage 1 Infection of bone and tissue without cranial nerve paralysis
Stage 2 Cranial Nerve Paralysis
a.Facial Nerve Paralysis only
b Multiple Cranial nerve Paralysis
Stage 3 Meningitis, Epidural empyema, Subdural empyema or Brain abscess

DATA ANALYSIS

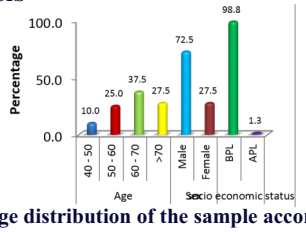

Fig 1. Percentage distribution of the sample according toselected variables

Among 80 cases, maximum number of cases are in the 60-70 year age group(37.5%) group. Mean age was 64.6 ± 11.3yrs.

In this study 58 cases (72.5%) were males and 22 cases(27.5%) were females

Most patients belong to BPL group.

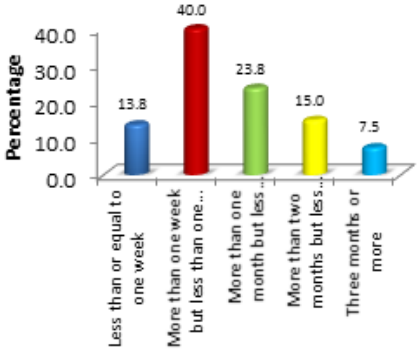

Fig 2. Percentage distribution of the sample according to diagnostic delay

Of the 80 cases studied, 40% (32 cases) presented within a month of onset of symptoms whereas 23.8%(19 cases) presented within 2 months of onset of symptoms.

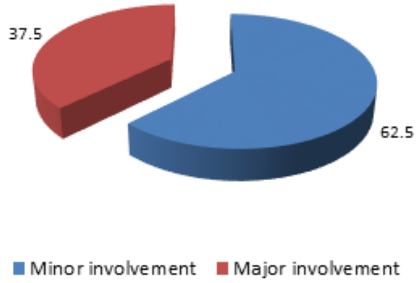

Fig 3. Percentage distribution of the sample according to image grade
Most of our patients had minor involvement in CT scan 50 cases (62.5%),while major involvement was seen in 30 cases(37.5%)Minor involvement is disease limited to EAC and mastoid,and Major involvement is disease spread to TM joint,Infratemporal fossa,nasopharynx and skull base.

34 patients(42.5%) had Pseudomonas infection and 15 cases (18.8%) had staph aureus infection.

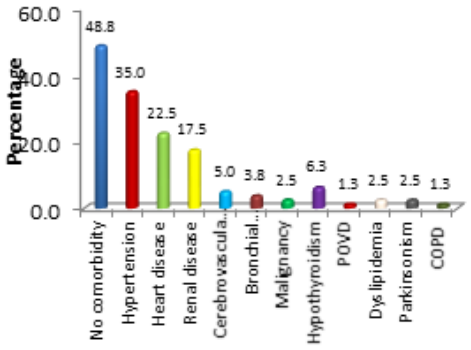

Fig 4. Percentage distribution of the sample according to co morbidities

All patients had Diabetes Mellitus (100%) The duration of diabetes was >10 yrs in 37 cases (46.3%) and <5 yrs in 26 cases(32.5%).other comorbidities were,Hypertension(35%),heart disease(22.5%),renal Disease(17.5%) were found to be common. And 12.5% cases had more than 2 comorbidities.

25% patients had facial palsy and 5% had other cranial nerve palsy.

Table 1. Percentage distribution of facial nerve recovery

Facial nerve recovery	Count	Percent
Recovery	12	60.0
No Recovery	8	40.0

Table 2. Percentage distribution of surgical intervention

Surgical intervention	Count	Percent
Canal debridement	71	88.8
Mastoidectomy	4	5.0
None	5	6.3

Canal debridement was done in 71% cases and tissue was taken for biopsy.4 cases (5%) underwent mastoid exploration.3 cases underwent Modified radical mastoidectomy and one underwent Atticotomy amd tympanoplasty

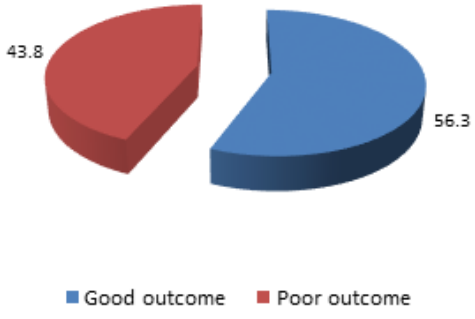

Fig 5. Percentage distribution of the sample according to outcome

45 cases (56.3%) had good outcome and 35 cases (43.8%)had poor outcome after treatment.

Table 3. Factors associated with poor prognosis among patients with Malignant Otitis Externa

		Good outcome		Poor outcome		x^2	p
		Count	(%)	Count	(%)		
Age	4	15	53.6	13	46.4	0.16	0.925
	60 - 70	17	56.7	13	43.3		
	>70	13	59.1	9	40.9		
Sex	Male	33	56.9	25	43.1	0.04	0.850
	Female	12	54.5	10	45.5		
Diagnostic delay	<1 Month	25	58.1	18	41.9	4.84	0.089
	1 - 2 Months	7	36.8	12	63.2		
	>2 Months	13	72.2	5	27.8		
Complications of diabetes	Present	11	52.4	10	47.6	0.17	0.677
	Absent	34	57.6	25	42.4		
ESR	<35	21	65.6	11	34.4	4.44	0.218
	36 - 75	14	60.9	9	39.1		
	76 - 100	6	46.2	7	53.8		
	>100	4	33.3	8	66.7		
Facial palsy	Present	8	40.0	12	60.0	2.86	0.091
	Absent	37	61.7	23	38.3		
other cranial nerve palsy	Present	4	100.	0	0.0	3.27	0.070
	Absent	41	53.9	35	46.1		
Microbiological profile	Pseudomonas aeruginosa	22	64.7	12	35.3	2.61	0.455
	Staphylococcus aureus	7	46.7	8	53.3		
	Sterile	10	58.8	7	41.2		
	Others	6	42.9	8	57.1		

Multiple logistic regression analysis was carried out to find independent predictors of poor prognosis among patients with Malignant Otitis Externa.

Table 4. Factors associated with poor prognosis among patients with Malignant Otitis Externa

		Good outcome	Poor outcome	x^2	p	Odds (95% CI)
Co morbidity	Absent	27 (69.2)	12 (30.8)	5.21*	0.022	1
	Present	18 (43.9)	23 (56.1)			2.88 (1.15 – 7.2)
Duration of diabetes	Less than 5 yrs	23 (88.5)	3 (11.5)	25.22**	p<0.01	1
	Between 5 - 10 yrs	12 (70.6)	5 (29.4)			3.19 (0.65 – 15.70)
	>10 yrs	10 (27)	27 (73)			20.7 (5.08 – 84.36)
Image grade	Minor involvement	34 (68)	16 (32)	7.48**	0.006	1
	Major involvement	11 (36.7)	19 (63.3)			3.67 (1.42 - 9.50)

**: - Significant at 0.01 level, *: - Significant at 0.05 level

Table 5. Independent Factors associated with poor prognosis among patients with Malignant Otitis Externa (Multiple logistic regression)

		B	S.E.	p	Odds (95 % CI)	R^2
Co morbidity (Absent ®)	Present	1.29	0.63	0.039	3.63 (1.06 - 12.36)	0.395
Duration of diabetes (Less than 5 yrs ®)	Between 5 - 10 yrs	1.58	0.91	0.083	4.86 (0.81 - 29.05)	
	>10 yrs	3.42	0.85	0.000	30.55 (5.75 - 162.33)	
Image grade (Minor involvement ®)	Major involvement	2.04	0.72	0.004	7.68 (1.89 - 31.23)	

The R^2 of the regression was found as 0.395, it means that 39.5 percent of variation on poor prognosis among patients with Malignant Otitis Externa can be explained by these three independent variables.

Among factors associated with poor prognosis in MOE, Age, sex, diagnostic delay, complications of Diabetes, ESR, Cranial nerve palsy and microbiological profile did not show statistically significant association with the outcome.

Duration of Diabetes (p value 0.022) Associated comorbidities (p value 0.01)and Image grade (p value0.006) shown statistically significant association with outcome.

DISCUSSION

This study included 80 cases of Malignant otitis externa admitted and treated in the Department of ENT ,Medical college Hospital Trivandrum.from March 2013 to March 2019.

Among 80 cases,maximum number of cases are in the 60 -70 year age group(37.5%) followed by 27.5 % in >70 age group.Mean age was 64.6+or_11.3yrs. 58 cases (72.5%)were males and22 cases(27.5%) were femalesMost patients belong to BPL group.

In a study by Shavit et al of 88 patients, mean age was 73 + or – 11.5 years and 69 percent were males. In a study by Sang kuk lee at al of 28 patients, 22 males(78.6 percent) and 6 females(21.4 percent) with a mean age of 65+or_13 Years(range 33 to 81 yrs)

In our study, all patients had Diabetes Mellitus (100%).other comorbidities were Hypertension(35%),heart disease(22.5%),renal Disease(17.5%) were found to be common. 12.5% cases had more than 2 comorbidities. . The duration of diabetes was >10 yrs in 37 cases (46.3%) and <5 yrs in 26 cases(32.5%)

Shavit et al found in his retrospective study of 88 patients that most common morbidity was Diabetes(97.5%) followed by hypertension (64%) and ischemic heart disease(34%). In a retrospective study of 28 patients by sang kuk lee et al, 82.1 % was found to have diabetes.

Most of our patients had minor involvement in CT scan 50 cases (62.5%),while major involvement was seen in 30 cases(37.5%)Minor involvement is disease limited to EAC and mastoid and major involvement is disease spread to TM joint, Infratemporal fossa, nasopharynx and skull base.

In the study by shavit etal,75% patients had minor involvement in CT scan and 25% had major involvement .

In patients with Facial palsy,12 cases(60%) had good recovery, whereas the rest had no recovery at all. 45 cases (56.3%) had good outcome and 35 cases (43.8%)had poor outcome after treatment. 11 cases (13.8%) developed relapses and required multiple admissions. Relapse rate is 13.8% which is similar to other studies(Singh et al 2005)2.6% was the relapse rate in another study(Hasibi et al2017)

Among factors associated with poor prognosis in MOE, Age, sex, diagnostic delay ,complications of Diabetes, ESR, Cranial nerve palsy and microbiological profile did not show statistically significant association with the outcome.

Duration of Diabetes (p value 0.022),associated comorbidities (p value 0.01)and Image grade (p value0.006) shown statistically significant association with outcome.

Franco vidal(2007)l in an analysis 0f 46 patientsand Loh and colleagues in an analysis of 19 did not find that age affected patient outcomes

The duration of diabetes was related to prognosis of MOE according to Joshua et al. In contrast, Franco vidal reported that the presence of diabetes was not a significant prognostic factor in and of itself. Chen et al also suggested that duration of diabetes and degree of glycemic control did not affect survival.

Peleg et al suggested that MEO patients with severe disease will have involvement of two or more of the following areas in CT Scan- TMJ ,temporal bone and skull base.Loh et al correlated prognosis to minor(EAC involvement, mastoid involvement) and major (TMJ, Infratemporal fossa and nasopharynx) CT findings, but found no significant correlation. Sudhoff et al found no correlation with prognosis. Stevens et al included involvement of 2 sites on CT scan as a designation of severe MOE.

Studies have shown that facial palsy is less likely to improve after treatment, but presence of cranial nerve involvement does not affect overall prognosis (Mani et al 2007) Mani et al(2007) found no difference in mortality for 6 patients with facial nerve paralysis among 23 with MEO. Their results demonstrated that patients with facial nerve palsy did not regain complete recovery despite medical treatment. Franco Vidal et al published their experience of 46 patients and showed that facial paralysis presented in 20 percent and was a significant risk factor for mortality. Loh et al showed a similar trend in 19 patients 4 of whom presented with palsy. According to the classification of Stevens et al, facial nerve palsy defines a severe form of MEO and was correlated to increased mortality. Chen et al reported that in patients with MOE, mortality was not related to involvement of a single cranial nerve, but was related to involvement of multiple cranial nerves.

CONCLUSION

In our study, Diabetes as a predisposing factor was observed in all the cases of MOE. Pseudomonas was the most common infecting pathogen, followed by staphylococcus aureus. Duration of diabetes, associated comorbidities and disease extent on CT scan are significantly related to the prognosis of MOE.

Age and sex of the patient, complications of Diabetes, microbiological profile and cranial nerve palsy do not have a statistically significant association with the outcome of MOE. No factor related to treatment modality was correlated to prognosis such as medical treatment, surgery or interval to first appropriate treatment

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