RECURRENT NECROTIZING EXTERNAL OTITIS: MEDICAL VS SURGICAL TREATMENT

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ABSTRACT

Necrotizing (malignant) external otitis (NEO) is a fulminant skull base osteomyelitis that appears to follow a minor episode of external otitis. The present study aimed to evaluate the outcome of medical and surgical treatment in recurrent cases. Eleven patients attending the otorhinolaryngology Department, Misrata Cancer Center were included. They had recurrence of external otitis over a period of 6 months after cure, as well as severe night otalgia and high ESR level. Peri-auricular soft tissue swelling, trismus and cranial nerve paralysis were the main persistent or developing presentations in recurrent cases. Extensive surgical intervention was performed in two patients with unsatisfactory outcome. On the other hand, satisfactory results were obtained with those who treated with specific medical therapy after culture and sensitivity test and those who underwent minimal surgical intervention. In conclusion, NEO is an aggressive disease that necessitates controlling the blood sugar vigorously and also appropriate antibiotics, the surgical intervention is reserved only for those patients with poor response to medical treatment or complications.

INTRODUCTION

Malignant Otitis external (MOE) is a life threatening, progressive inflammation of the external auditory canal (EAC), mastoid and skull base. It most commonly occurs in elderly diabetics or in an otherwise immune compromised host (1).

Since both ageing and diabetes mellitus are associated with abnormalities of small blood vessels, it has been postulated that microangiopathy in the ear canal predisposes elderly diabetic patients to malignant external otitis. Most cases (86–90%) have been reported in diabetic patients. Pseudomonas aeruginosa is nearly always the causative organism (>98% of cases) (2).

Patients with osteitis of the base of the skull sometimes have extra-auricular manifestations such as cervical lymphadenopathy, trismus because of temporomandibular joint (TMJ) involvement, or irritation of the masseter muscle(3). As the infection spreads in the temporal bone, it may extend into the cranium and result in cranial nerve palsies(4). Cranial nerve involvement indicates a poor prognosis(5), the death is usually due to intracranial complications(6).

Prolonged treatment with sensitive antibiotics is recommended for 6 to 8 weeks. Inadequate treatment can lead to recurrence of disease(7). The decision between conservative antimicrobial therapy and surgical treatment can present a therapeutic challenge in the management of these life-threatening infections, especially in patients with existing immunodeficiency and illness(8).

The aim of this work is to evaluate the outcome of medical and surgical treatment in recurrent NEO cases.

MATERIALS AND METHODS

The study was carried out on 11 out of 36 patients (30.5%) presenting with NEO to the outpatient clinic of otorhinolaryngology Department of Misrata Cancer Center from September 2013 to March 2015. These 11 patients, with recurrent NEO within a period of 6 months after cure were evaluated with regard to detailed history, thorough neurotological examination, and routine laboratory investigations including the ESR level, all patients signed a written consent to participate in the study.

A high-resolution multi-slice CT scan of the temporal bone and skull base with axial and coronal planes was performed. Histopathologic study of the granulation tissue biopsy was done to exclude malignancy.

Patients received systemic antibiotics (ciprofloxacin, ceftazidime or meropenem) according to culture and sensitivity and in some cases, combined third generation cephalosporin and ciprofloxacin was instituted, with adequate control of the diabetic state till clinical improvement and significant decrease in the ESR levels were achieved.

Local debridement of the external auditory canal was carried out and granulation tissue was cauterized by silver nitrate applicator (75%). Local ear drops (Ciprofloxacin) and/or cream (Triderm cream) were also applied. Extensive surgical interference or minimal surgical...
intervention was performed according to disease 
extension and cranial nerve paralysis. 
The follow-up period extended over 6 months regarding 
the clinical presentation, the ESR and fasting blood-sugar 
levels. The outcome of medical and surgical treatment 
was assessed at the end of the follow-up period. 
Frequency tables, mean and standard deviation were used 
to describe the study sample, for all statistical analysis, 
P<0.05 was considered statistically significant. 

RESULTS 
The 36 patients presenting with NEO had an age range 
from 43 to78 years, with a mean of 57.13±7.81 years. The 
primary presentation of all patients with NEO was otalgia, 
otorrhea, hearing deterioration, granulations in the EAC, 
trismus and cranial nerve involvement, the FBS ranged 
from 98 to 382 mg/dl with a mean of 263±68.4 mg/dl and 
the ESR ranged from 70 to 148 mm/h with a mean of 
101.54 ±15.63 mm/h, on a high-resolution multi-slice CT 
scan of the temporal bone and skull base, the extrax 
auricular soft tissue involvement was in seven cases 
(19.4%), four cases to temporomandibular joint, two cases 
to muscles of mastication, one case to skull base and 
asopharynx (figure 1). 
The 11 patients with recurrent disease had a mean age of 
54.7±11.42 years, ranging between 48 and 75 years. They 
all presented with recurrent otalgia, ear discharge and 
hearing deterioration. Trismus, presence of external 
auditorycanal granulation and cranial nerve involvement 
were found in 8 cases each. Two cases developed facial 
nerve paralysis during the follow-up period. 
The mean ESR level was 103.7±15.67 mm/h ranging 
from 78 to 138 mm/h and that of fasting blood sugar level 
was 228.3± 88.23 mg/dl ranging from 142 to 352 mg/dl. 
Multi-slice CT scan show extraauricular soft tissue 
involvement in 27.2% of the cases, histopathology of all 
biopsies revealed chronic non-specific inflammation 
without any evidence of malignancy. 

Regarding management modalities, all patients received 
medical therapy in the form of a combination of oral or 
parenteral antibiotics after specific culture and sensitivity. 
All six patients, who received only medical treatment 
were improved. Three patients underwent minimal 
surgical interference in the form of local debridement of 
sequestrated tissues, improved without any complication, 
two patients underwent cortical mastoidectomy and facial 
nerve decompression, one out of these two improved, 
while the other deteriorated due to diabetic nephropathy. 
Statistically, there was significant relationship between 
the type of management and the outcome (P = 0.042), 
those who improved had statistically significant 
difference with regard to their mean ESR and their mean 
FBS after 6 month period. As for the clinical presentation, 
there was no statistically significant difference at the end 
of the follow-up period. 

DISCUSSION 
NEO is defined as a distinct disease that possesses 
aggressive clinical behavior as malignancy with poor 
treatment outcome, and a high mortality rate for the 
affected patients(9). 
In spite of the constant presentations in recurrent NEO as 
otorrhea, night otalgia, hearing loss and presence of 
granulation tissue of the EAC, trismus was an important 
presentation due to infiltration of soft tissue surrounding. 
This was also declared by Sardesai et al.(7) and Shimizu 
et al.(10) 
We found that 18.1% of patients presenting with recurrent 
NEO suffered from facial nerve paralysis, these results 
are consistent with those found by Rubin et al.(2) that 
paralysis of the facial nerve is most common, followed by 
the glossopharyngeal, vagal, and spinal accessory nerves 
at the jugular foramen, and the hypoglossal nerve as it 
exits the hypoglossal canal. 
The CT scan results revealed that the epicenter of this 
pathology was encrypted to the EAC, tympanic cavity, 
and the mastoid air cells (localized to the ear) in 83.4% of 
patients. Extension to the surrounding soft tissue are as 
involved the infratemporal fossa, nasopharynx, 
parapharyngeal space, and bony areas, such as the petrous 
bone, TMJ, and base of skull (extension beyond the ear) 
in 27.2% of cases. Peleg et al.(11) found that in CT scans of 
the 18 patients, 90% had involvement of the EAC, 
tympanic cavity, mastoid, and nasopharynx, while only 
30% had some degree of involvement of the bony areas 
(TMJ, temporal bone, and skull base) and the parotid 
gland. 
The ESR values are usually a good indicator of the 
improvement and follow up of the disease. ESR 
significantly dropped from a mean pre-treatment value of 
103.7±15.67 mm/h (78 to 138 mm/h) to a mean value of 
57.8 ± 29.84 mm/h (29–87 mm/h). These results agree 
with those of Singh et al.(4) as well as Karantanas et 
et al.(12)

Figure 1: Axial CT scan showing ostitis limited to Rt mastoid process with granulation tissues filling the external auditory canal.
18.1% of our recurrent patients underwent extensive surgery in the form of mastoidectomy and facial nerve decompression. On the other hand, three patients had minimal surgery in the form of local debridement of granular tissue in EAC. Parenteral antibiotics followed the surgical intervention was the schedule in the follow-up period. The remaining six patients received only medical therapy without any surgical intervention, according to specific culture and sensitivity test.

The outcome of the extensive surgical intervention was unsatisfactory as one patient out of two was improved; while the other deteriorated due to diabetic nephropathy, on the contrary, patients who were treated medically improved and the 3 patients who were underwent minimal surgical intervention improved without any complication, show (Fig.2).

These results are consistent with Peleg et al.(11) five of the 18 patients they had were extremely difficult to treat and were included in the “severe” group. They were hospitalized for 3-5 months (one died after 6 months because of cardiac disease). Each of these patients underwent two to three extensive operations (any one or a combination of radical mastoidectomy, TMJ excision, parotidectomy, partial removal of the zygomatic arch, and bony/soft tissue debridement of the infratemporal fossa and skull base). Three developed deep fungal infection during the antibiotic treatment and were treated with amphotericin B. Two had transient renal failure due to this treatment. Two developed disturbance of liver functions after treatment with itraconazole. All five had at least one cranial nerve palsy. The remaining 13 patients were included in the “non-severe” group. They were treated as in-patients for less than 3 months (2-10 weeks) and responded well to antibiotics. None of them underwent extensive surgery. Some had debridement of external auditory canal granulations.

In addition, Karantanas et al.(12) found that the mainstay of treatment was administration of antipseudomonal antibiotics for 4-8 weeks. Recurrence is common and mortality remains at about 20%, despite antibiotic therapy. Extensive surgical debridement of all the infected tissue is no longer considered the treatment of choice and has been replaced by localized surgical debridement supplemented with long-term antimicrobial chemotherapy. In conclusion, recurrent NEO is a fulminant disease that needs to be managed carefully, the ESR proved to be a good indicator of treatment response. Antibiotic therapy and local debridement of granulation tissue with adequate control of the diabetic state till clinical improvement and significant decrease in the ESR levels were achieved is recommended for recurrent cases, and aggressive surgical strategies should be avoided.

REFERENCES


