

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, Misurata 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 Misurata 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 neurological 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 to 78 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 extra-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 nasopharynx (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 auditory canal 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 extra-auricular soft tissue involvement in 27.2% of the cases, histopathology of all biopsies revealed chronic non-specific inflammation without any evidence of malignancy.

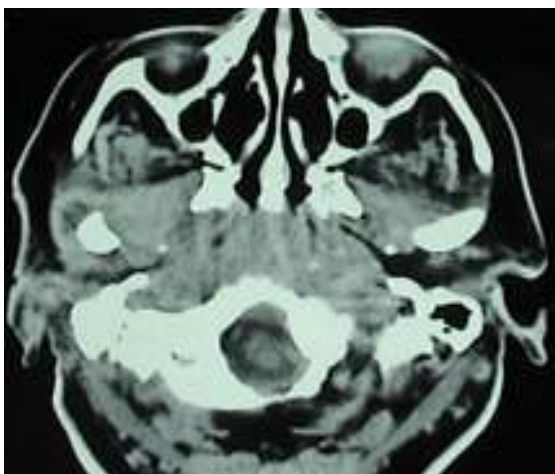


Figure 1: Axial CT scan showing ostitis limited to Rt mastoid process with granulation tissues filling the external auditory canal.

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 sequestered 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 Karantanis et al.(12)

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.

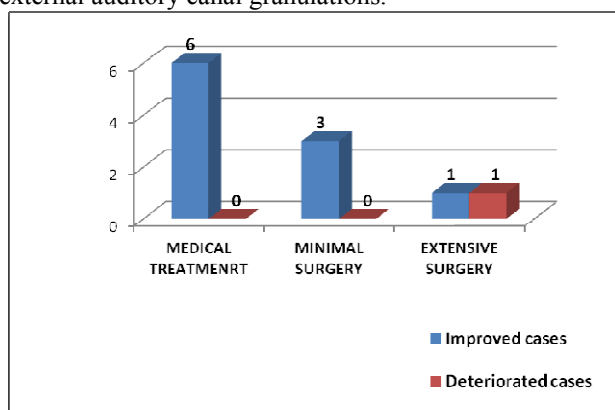


Figure 2 chart showing the outcome of medical and surgical treatment after follow up period (6 months) in recurrent NEO cases.

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.

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