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Malignant (invasive) otitis externa involving the temporomandibular joint

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Abstract
Malignant (invasive) otitis externa (MOE) is an infection involving the external auditory meatus (EAM), most often found in elderly diabetics, which carries a high morbidity and mortality. In advanced cases it may give rise to osteomyelitis and cranial neuropathies. This is a case of MOE, which invaded the posterior wall of the right temporomandibular joint (TMJ), resulting in severe trismus and pain. Subsequently, this required treatment by replacement of the glenoid fossa with a Silastic® prosthesis.

Key words: Otitis Externa; Temporomandibular Joint; Surgical Procedures, Operative; Treatment Outcome

Introduction

Malignant (invasive) otitis externa is defined as a potentially fatal infection of the external auditory meatus (EAM). Complications of the temporomandibular joint (TMJ) are rare. The most commonly isolated pathogen is *Pseudomonas aeruginosa*. In severe cases, the infection can affect surrounding soft and hard tissue structures and in addition can lead to cranial neuropathies. Diagnosis of malignant otitis externa may be difficult to differentiate from chronic otitis externa, which is a relatively common infection of the EAM. The diagnostic criteria are controversial. These include the presence of persistent otitis externa refractory to treatment, severe otalgia, granulation tissue in the EAM and cranial neuropathies. Treatment includes long-term systemic or topical antibiotics, usually ciprofloxacin. Surgical intervention is indicated after failure of medical therapy. Prompt surgical intervention is indicated once bony involvement is clearly demonstrable due to the difficulty of eradicating osteomyelitis with medical therapy alone.

Case report

A 55-year-old male construction site worker presented to the Department of Otorhinolaryngology at Ninewells Hospital, Dundee on 10 November 2003. He complained of a 10-week history of right-sided otalgia and six weeks of severe trismus. He also complained of long-term hearing loss and tinnitus in the right ear. Prior to this presentation, he had been treated in October 2003 for right-sided recurrent otitis externa that was unresponsive to various regimes of antibiotics, microsuction, packs and triadcortyl ointment.

His past medical history included hypertension, emphysema and an arthritic acromioclavicular joint. His regular medication comprised Bendrofluazide 2–5 mg daily and a Combivent inhaler. He had a long-term history of heavy cigarette smoking.

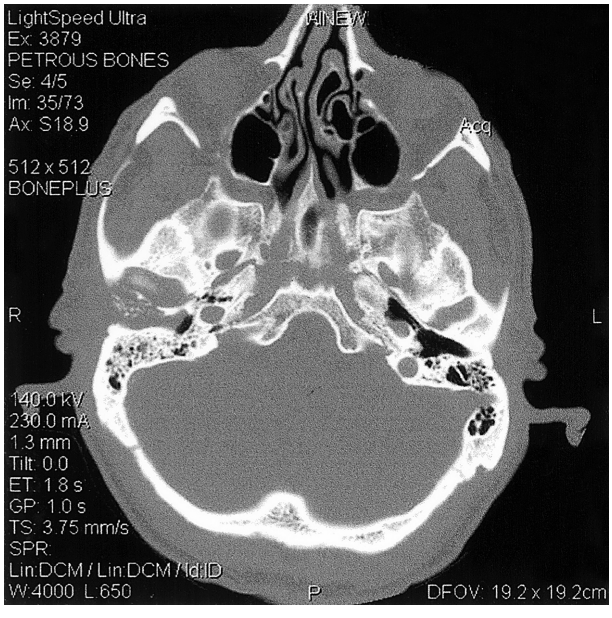

Fig. 1
CT scan of the temporal bones.

Fig. 2
CT scan of the temporal bone (sagittal view).

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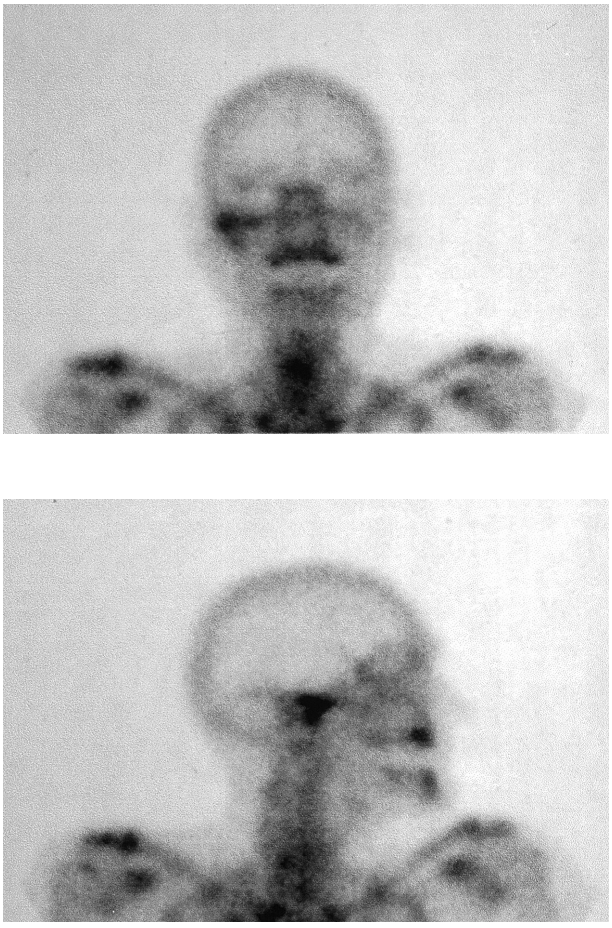

FIG. 3
Radionucleotide bone scan [99^{m}Tc] of head and neck.

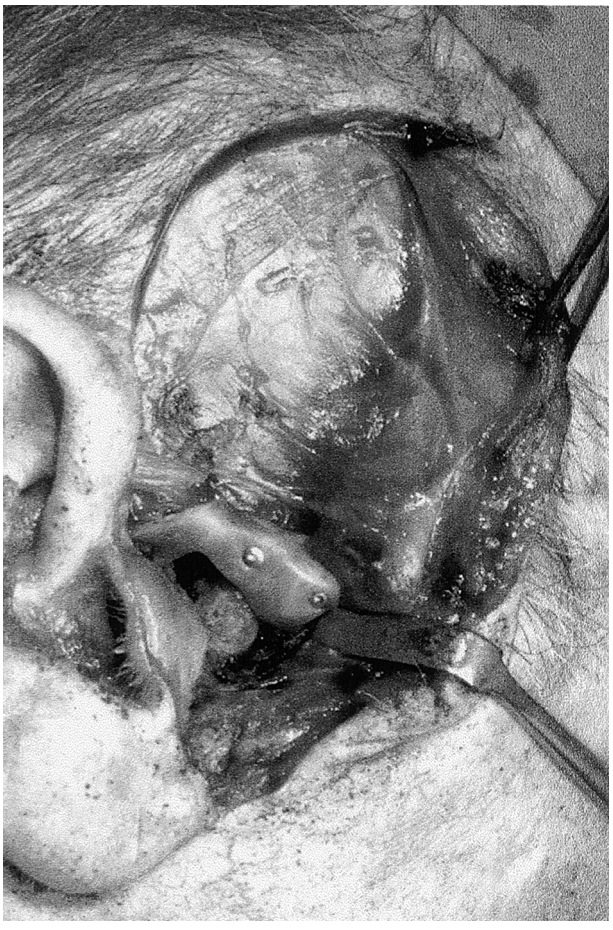

FIG. 4
Intra-operative photograph of Silastic® implant placement.

On physical examination, exudative otorrhoea, a small swelling from the roof of the cartilaginous canal and a dull tympanic membrane were noted.

- **Malignant otitis externa has been extensively reported and the pathophysiology is well documented**
- **In this paper, bone erosion involved the temporomandibular joint and, as a result, the glenoid fossa had to be replaced with a Silastic® prosthesis**

The patient was admitted to hospital. A computed tomography (CT) scan revealed a soft tissue mass occupying the right EAM, as well as opacification of the right mastoid air cells, suggesting associated mastoiditis, and the destruction of the anterior bony wall of the external canal with early involvement of the right TMJ (Figures 1 and 2). At the site of bone destruction there was evidence of a subperiosteal abscess in contact with the posterior portion of the right mandibular condyle. A working diagnosis of aggressive right otitis externa with associated right mastoiditis was given at this stage.

A radionucleotide bone scan [99^{m}Tc] showed a marked increase in uptake in the right temporal bone consistent with osteomyelitis in the anterior aspect of the EAM (Figure 3). Microbiology failed to reveal any pathogenic organisms. Bloods tests performed were FBC, U and E, glucose and CRP, which were normal; ANCA and ANA were both negative. The associated bony destruction and subperiosteal abscess suggested an early case of MOE, a condition that was first defined in 1968 by Chandler,[1] and as such the patient was commenced on 750 mg oral ciprofloxacin twice daily. A maxillofacial opinion was sought.

The condition failed to respond to these measures and an extended right cortical mastoidectomy and right myringoplasty were performed on the 18 November 2003. As there were persistent TMJ symptoms and CT evidence of joint involvement, fossa prosthesis surgery of the right TMJ was performed on the 22 March 2004. This involved replacement of the glenoid fossa with a Silastic® implant (Figure 4). The TMJ meniscus was removed and the condylar head was found to be intact. The operative findings were fibrous tissue in the superior joint space and a bone sequestration posteriorly.

Discussion

Malignant otitis externa can be difficult to differentiate from otitis externa, which is a relatively common condition. The differential diagnosis also includes acute mastoiditis and osteomyelitis of the temporal bone. Despite the relatively close proximity of the TMJ to the EAM, complications of the TMJ are very rare. Potential routes of communication between these structures are congenital dehiscences of the cartilaginous canal (Santorini's fissures),[2] a dehiscent squamotympanic fissure, or failure of closure of Huschke's foramen before the fifth year of life.[3] The authors have no clear evidence of the route of spread of infection in this case. The decision

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to intervene surgically is contentious. Where there is abscess formation or osteomyelitic bony destruction of the condyle, glenoid fossa or temporal bone, such intervention is indicated as prolonged oral antibiotic therapy alone is rarely effective.[4] The prolonged symptom of severe trismus is rare in cases of malignant (invasive) otitis externa. This case is unusual in that it required the glenoid fossa to be replaced with a Silastic® prosthesis. Following a thorough search of the English medical literature the authors have found no other such cases where the glenoid fossa has been replaced with a Silastic® prosthesis alone.

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