Telltale Signs

Otitis externa: Presentation and management

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Otitis externa is a common condition presenting in both general and hospital practice. Diagnosis and treatment are usually straightforward; however appropriate management requires recognition of predisposing and precipitating factors, effective cleaning of the external auditory canal and administration of suitable topical or systemic medication or both. The aim of this article is to provide an overview of the clinical features and management of otitis externa with a discussion of the differential diagnosis.

'Otitis externa' is the generic term used to describe an inflammatory condition of the external auditory canal. It may be acute or chronic, localised or diffuse, involving only the external auditory canal or as part of a generalised skin condition. Otitis externa may be subclassified according to a variety of predisposing or precipitating factors such as genetic predisposition, local and environmental factors, local trauma and bacterial or fungal organisms *(Table 1).*

Table 1.

Localised	Diffuse	Associated generalised skin conditions
Furunculosis	Idiopathic	Seborrhoeic dermatitis
	Traumatic	Allergic dermatitis
	Irritant	Atopic dermatitis
	Allergic	Psoriasis
	Bacterial	Neurodermatitis
	Fungal	
	Climatic / environmental	
	Other.	

Localised otitis externa - furunculosis

Localised otitis externa is most commonly associated with staphylococcal infection of a hair follicle in the lateral external meatal skin *(Figure 1).* This condition is called furunculosis. Initial symptoms are tenderness and pain in the meatus which may be aggravated by jaw movement. As the condition progresses pain may become more severe and if the meatus is occluded conductive hearing loss may occur. Eventually the furuncle discharges and the condition rapidly resolves.

Diffuse otitis externa - acute

Clinical features

Diffuse otitis externa is a common condition and characteristically presents in the acute stage. Discomfort and itching developing into severe pain in and around the ear, are common symptoms. The ear is tender to touch and pain may be aggravated by movement of the jaw. The diffuse swelling of the ear canal may result in occlusion of the meatus with associated hearing loss *(Figure 2).*

On examination, the external canal skin is inflamed, swollen and exquisitely tender. Serous or seropurulent discharge may be found in the meatus *(Figure 3).* Initially the skin of the lateral cartilaginous external canal is involved with progression to the medial bony canal and tympanic membrane. As the disease progresses the meatal epithelium desquamates forming a mass of macerated cheesy debris. The tympanic membrane may be dull and injected in appearance. There may be swelling of the soft tissue of the pinna, particularly over the tragus and conchal bowl.

Cause

Diffuse otitis externa is commonly known as swimmer's ear or tropical ear. Although heat, humidity and swimming may be aggravating factors, local trauma is perhaps the most frequent predisposing cause. Scratching the ears, cleaning with cotton buds or other objects and even unskilled syringing may result in minor abrasions to the meatal skin and provide access for causative organisms. *Pseudomonas aeruginosa* is the bacterium primarily responsible for diffuse otitis externa. Proteus and *Staphylococcus aureus* are also commonly found, and often, two or more organisms will be cultured.

Diffuse otitis externa - chronic

Clinical features

The chronic stage of diffuse otitis externa is an indolent inflammation of the external ear canal *(Figure 4).* In contrast to the acute stage this is generally a painless condition, the predominant symptoms being itch and scanty discharge. Hearing impairment may occur secondary to the accumulation of debris within the external canal. Often this becomes deeply impacted by repeated itching or cleaning of the ear. There is little tenderness and in fact cleaning the external canal often produces some relief of the irritation. The skin of the external canal is shiny and inflamed with normal cerumen usually absent. With time the meatal skin becomes thickened with narrowing of the external canal lumen. This may progress to severe stenosis of the ear canal, secondary to subepithelial fibrosis *(Figure 5).* There may be pus and debris within the meatus and granulation in the canal or on the tympanic membrane denoting loss of epithelium *(Figure 6).*

Cause

The cause of chronic otitis externa may be infective or reactive. The reactive group include the generalised skin conditions, seborrhoeic, allergic and atopic dermatitis, psoriasis and neurodermatitis *(Figure 7).* Predisposing factors may be a genetic predisposition to dermatitis or local anatomical factors such as the presence of bony exostoses narrowing the external canal *(Figure 8).* Local environmental factors include humidity, local trauma and bacterial or fungal organisms.

Diagnosis and differential diagnosis

Acute otitis externa will be suggested by the clinical history and may be obvious on examination if the features described above are readily apparent. Pain is produced on pressing the tragus or pulling the pinna upwards and backwards. Where there is gross meatal swelling, examination of the deep external auditory canal can be very difficult. Difficulties in diagnosis arise when the tympanic membrane cannot be visualised or when swelling and cellulitis involves the pinna and pre- or post-auricular region. Erysipelas may occur secondary to acute otitis externa with associated facial cellulitis and must be distinguished from perichondritis of the auricle as the latter results from pseudomonas rather than streptococcal infection *(Figure 9 and 10).* Otitis externa may occur secondary to acute or chronic otitis media, which is only excluded after visualisation of a normal or intact tympanic membrane *(Figure 11).* Post-auricular swelling and tenderness associated with acute otitis externa must be distinguished from acute mastoiditis. In the latter, tenderness will be maximum over the mastoid antrum, the pinna is typically projected forwards and downwards, there is little or no discomfort on moving the tragus and pinna and on X-ray or CT scan the mastoid air cells will be opacified.

Otomycosis

Fungal otitis externa is more common in tropical rather than temperate regions. Fungal infection may develop as a primary infection or more commonly as a mixed infection with bacteria. Possibly it may result from prolonged treatment of an initial bacterial infection with topical antibiotic and steroid preparations. The fungi most frequently isolated are *Aspergillus niger* and *Candida albicans.* Symptomatically the condition may be indistinguishable from bacterial otitis externa although irritation may be marked. On examination a mass of greyish white debris is usually found in the medial external canal. The characteristic black spores of *Aspergillus niger* may be seen *(Figure 12)* or a clump of fine white filaments may be present.

Malignant otitis externa

This term does not refer to a neoplastic condition of the external ear canal but rather to a severe progressive infection starting in the external meatus and rapidly involving the temporal bone and adjacent soft tissues. The causative organism is *Pseudomonas aeruginosa* and the condition usually occurs in elderly, poorly controlled diabetics, or immunocompromised patients. It may develop in a pre-existing chronic otitis externa but is often insidious in onset with minimal

evidence of meatal infection. There may be granulation tissue along the floor of the bony external canal overlying areas of osteitis.

Associated clinical features are severe pain and development of cranial nerve palsies. Once clinically suspected, diagnosis is confirmed by isotope bone scanning. Treatment requires long-term intravenous antipseudomonal antibiotics, usually a combination of an aminoglycoside and ticarcillin sodium.

Neoplastic lesions

Tumours of the external auditory canal and middle ear may be benign or malignant and of varied histologic types. Chronic inflammation of the external canal or chronic otitis media are thought to predispose to malignant tumours such as squamous cell carcinoma. Unfortunately these tumours are often unrecognised and treated for prolonged periods as chronic otitis externa. Eventually diagnosis is obvious because of pain, exophytic tumour growth or facial nerve palsy, by which time the chance of curative therapy is remove. One must be suspicious of any ulcerated lesion or persistent granulation within the external ear canal and not hesitate in obtaining a biopsy or referring for otolaryngologic opinion.

Bullous myringitis

This condition, also known as otitis externa haemorrhagica, is usually extremely painful, of sudden onset, and is thought to be due to *Mycoplasma pneumoniae.* There may be a mild conductive deafness and a mildly discharging ear. The appearance of haemorrhagic bullae on the tympanic membrane and in the deep meatus is characteristic. The bullae are filled with sero-sanguinous fluid and blood.

Treatment

Localised otitis externa

Furunculosis in the early stage is best treated by local heat and analgesia. A gauze wick soaked with glycerine and ichthammol is an effective method of reducing oedema and pain. Incision is of no value unless the furuncle is obviously pointing, and is not recommended as this may lead to perichondritis.

Topical antibiotics may be used but are also probably of little value. Systemic antibiotics are indicated if there is marked cellulitis, lymphadenitis or multiple furuncles. Penicillin or flucloxacillin is usually effective or erythromycin for those with penicillin allergy. A swab should be taken for culture and sensitivity testing.

Diffuse otitis externa

If there is minimal keratin or cerumen debris within the external canal, acute diffuse otitis externa may settle with application of topical antibiotic drops alone. Similarly many cases will recover simply after thorough cleansing of the external ear canal by suction, dry mopping or gentle syringing. Often there is considerable debris which requires meticulous cleaning to remove.

The deep anteroinferior meatal recess can be particularly difficult to clean and is often where pus and debris accumulate. The ear should be gently cleaned with a probe covered in cotton wool or by suction. The frequency of aural toilet depends on the severity of the infection. Severe infections initially require daily attention. Syringing is generally not recommended in acute otitis because of the associated discomfort and in chronic otitis externa the debris and hyperkeratotic epithelium tends to become macerated and syringing may precipitate an episode of acute infection.

Adequate light is essential for both accurate diagnosis and safe cleaning of the external ear auditory canal. Although a conventional head mirror may suffice, a head light suitable for visualisation down an aural speculum is most suitable. For this the Vorrath biotoscope is highly recommended as stereoscopic vision down the speculum is possible and one's hands are free to facilitate cleaning. Ideally a swab should be taken of any discharge and cultured. Most cases however respond to broad spectrum topical antibiotics and so microbiology can be reserved for resistant cases.

Where there is minimal swelling and the external meatus is clearly patent, antibiotic drops may be instilled directly, initially 4 hourly. If there is swelling that occludes the meatus to any degree, the drops are most effective if applied to a wick. The simplest and most painless type of dressing is a Pope wick. This comes as a narrow compressed sponge that can be inserted even when there is severe oedema and once moistened with drops, it expands to fill the meatus and effectively carries the medication to the medial canal. Alternatively, a ribbon gauze dressing may be introduced. The dressing may be soaked with corticosteroid ear drops or an astringent such as aluminium acetate solution or glycerin ichthammol.

The topical anti-infective agents are those that are not used systemically (for example, framycetin, neomycin or clioquinol). Prolonged use such as more than one week, may result in fungal infection and necessitate change in treatment.

Allergic contact dermatitis is another problem which may occur due to development of sensitivity to the antibiotic or solvent (particularly neomycin). This is characterised by persistent severe itching discomfort with an erythematous eczematous rash in the region of the pinna where the drops have contact *(Figure 13).* This is often mistaken for ongoing infection but resolves with cessation of the topical antibiotic and application of a corticosteroid cream or ointment. Solutions containing an anti-infective agent and a corticosteroid should be used in cases where infection is present together with inflammation and eczema. If dermatitis involves the conchal bowl or skin of the adjacent pinna then topical corticosteroid creams or ointment are required as well and

should be applied four or five times daily. Prolonged use should be avoided however. Ear drops that are of thin liquid consistency are recommended as these most easily penetrate to the deep external canal and are suitable for use with the Pope wicks. Lotions of thicker consistency tend to accumulate in the ear canal and may themselves produce symptomatic obstruction.

For fungal otitis externa meticulous removal of the debris, upon which the fungae tend to grow, is essential. Preparations such as plumethasone pivalate (Locacortin-vioform) and clioquinol, which contain an antifungal agent, are necessary. Treatment should be continued for at least a week after the infection has apparently resolved.

For acute otitis externa, systemic antibiotics should be administered as an adjunct to local therapy if there is a significant cellulitis, or clinical progression despite topical treatment. A broad spectrum antibiotic such as Bactrim, Augmentin or erythromycin may be tried in the first instance, however, anti-pseudomonal activity may be necessary in which case Ciproxin should be considered. Where there appears to be a perichondritis or if there is severe cellulitis or pain, it may be necessary to administer intravenous antibiotics, in which case again anti-pseudomonal cover is necessary and ticarcillin is often used.

Acute otitis externa can be an extremely painful condition and effective analgesia is an important part of therapy. The patient should also be instructed in appropriate care of the ear. Keeping the ear strictly dry until the infection has completely resolved and avoid itching or instrumenting the external canal.

Chronic otitis externa usually does not require packing. Regular aural cleaning is necessary and refractory cases should be referred for microscopic toilet. An antibiotic-corticosteroid ointment may then be instilled.

With chronic otitis externa it is important to identify those factors that lead to exacerbation or recurrence of the condition. Underlying dermatitis must be diagnosed and treated. Many patients will attempt to clean their ears with cotton buds, often because of the relief of itching it affords, or in the mistaken belief that it is an effective way of clearing the ear of wax. Others will deliberately wash their ears in the shower, leading to chronic maceration of the epithelium perpetuating the otitis externa. Education regarding the avoidance of such habits will often allow the successful resolution of a long term problem.

In cases of chronic otitis externa once the infective component has been controlled, there may be a tendency for recurrent infection or irritation. The application of spirit drops will facilitate drying of the external canal epithelium (particularly after swimming or showering) and restore an acid pH, decreasing susceptibility to infection. Where the skin is dry and flaky and irritation is problematic, occasional instillation of oil drops (warmed baby oil or olive oil) can be very effective.