THE DISCHARGING EAR: A PRACTICAL APPROACH

Otorrhoea is a common presenting symptom, the cause of which can usually be established on the basis of the history and clinical examination.

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The substances that the ear may discharge include wax, pus, mucus, blood, cerebrospinal fluid (CSF) and saliva. Wax is the normal secretion of the glands of the external ear canal, and patients complaining of wax discharging from the ear should be reassured that it is not abnormal.

The common pathological causes of otorrhoea are the following:

- chronic suppurative otitis media (CSOM) with/without cholesteatoma
- otitis externa
- acute otitis media with perforation of the tympanic membrane
- CSF otorrhoea
- external or middle ear neoplasms
- granulomatous diseases — tuberculosis, atypical mycobacteria, Wegener's granulomatosis.

CLINICAL ASSESSMENT

History

The evaluation of a patient with otorrhoea starts with his/her history. The patient should be asked about the nature and duration of the discharge, and about the following otological symptoms:

- otorrhoea
- hearing loss
- tinnitus
- otalgia
- vertigo
- facial palsy.

The colour of the fluid can suggest the cause of the otorrhoea. A purulent discharge indicates the presence of infection, while a bloody discharge may follow trauma or occur with granulation tissue associated with chronic infection. The presence of a mucoid discharge indicates a perforation of the tympanic membrane — there are no mucous glands in the external ear canal; the fluid must therefore arise from the middle ear. Clear, watery fluid, especially when associated with a history of trauma or skull base surgery, is likely to be CSF.

Recurrent episodes of purulent otorrhoea suggest CSOM, while purulent otorrhoea of acute onset suggests acute otitis media with perforation of the tympanic membrane, or acute otitis externa. In acute otitis media, the pain characteristically improves when the tympanic membrane ruptures and otorrhoea starts. In otitis externa the pain is persistent. Otitis externa is characterised by a scanty, thin, watery discharge, usually preceded by itching or discomfort in the ear canal.

A foul-smelling discharge is usually associated with cholesteatoma or a neoplasm.

Vertigo and facial palsy associated with otorrhoea are indications for urgent referral. The differential diagnosis of vertigo associated with otorrhoea includes:

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- complication of CSOM — labyrinthine fistula or acute labyrinthitis
- inner ear erosion by tumour
- complication of acute otitis media.

The differential diagnosis of facial palsy associated with otorrhoea is:

- malignant otitis externa
- complication of CSOM with cholesteatoma
- malignant neoplasm
- Ramsay Hunt syndrome (herpes zoster oticus)
- skull base fracture.

The history should include details of other symptoms, as well as a general medical history.

Examination

A general examination is followed by an examination of the head and neck region, with particular emphasis on the ear.

After assessing the patient's hearing with a tuning fork, the pinna and external ear canal should be inspected with a headlight. The tragus should be palpated, with pain on palpation of the tragus or movement of the pinna being suggestive of otitis externa. The external ear canal and tympanic membrane should then be examined with an otoscope.

If the external ear canal is filled with discharge, a pus swab should be taken and the ear canal cleaned. Ear toilet is of the utmost importance in the treatment of otorrhoea with an infectious aetiology as it improves the quality of the examination and efficacy of ototopical agents. The latter must come into direct contact with affected tissue to be effective. This is done by mopping the ear canal using cotton buds or, if facilities are available, by microsuction. The ear canal should always be cleaned under direct vision. No instrument should be inserted blindly into the ear canal as the ear canal, tympanic membrane or ossicles may be traumatised. Syringing of the ear is contraindicated in a patient with otorrhoea, as the introduction of water may exacerbate an acute infection and water may enter the middle ear through a perforation.

In otitis externa, the skin of the external ear canal will be inflamed, with varying degrees of swelling and a small amount of secretions present. Examination is usually very painful. The presence of pus draining through a perforation or ventilation tube indicates that the middle ear is the site of infection. In CSOM, a perforation of the tympanic membrane can be seen. The middle ear mucosa may be inspected through the perforation. A marginal perforation, especially when located posterosuperiorly, is suggestive of cholesteatoma.

Special investigations

Besides a pus swab, the only other special investigation usually necessary is audiological testing. Radiological investigations are required only for complicated cases that should be referred.

THERAPEUTIC AGENTS

In all cases of a discharging ear, the patient should avoid allowing water to enter the ear.

Medical treatment and/or surgery is indicated in the treatment of a patient with a discharging ear. The various medications that may be used in treating a patient with otorrhoea are:

- systemic antibiotics
- topical antibiotics, e.g. aminoglycosides, quinolones
- topical antiseptics
- topical steroids
- topical antifungal agents
- analgesics.

Topical agents are frequently used in the treatment of most causes of otorrhoea as this modality allows a high concentration of the medication to be administered to the affected site while avoiding systemic side-effects.

The common bacterial pathogens in a discharging ear that can cause an infection are listed below (often more than one organism is cultured):

- *Pseudomonas aeruginosa*
- *Staphylococcus aureus*
- *Proteus spp.*
- *Streptococcus pneumoniae*
- *Haemophilus influenza*
- *Moraxella catarrhalis.*

Neomycin is effective against *Staphylococcus aureus* and *Proteus* spp., but has little effect against streptococci, *Pseudomonas aeruginosa* or anaerobes, while polymyxin B is effective against *Pseudomonas, S. aureus* and *Proteus* spp. Chloramphenicol is effective against a wide range of organisms, but is ineffective against *P. aeruginosa.* The fluoroquinolones (ciprofloxacin and ofloxacin) are effective against *Streptococcus pneumoniae, Haemophilus influenzae,*

Moraxella catarrhalis, staphylococci and *P. aeruginosa*. Ototopical antiseptics, such as acetic acid, boric acid, and Burrow's solution (13% aluminium acetate), have bacteriostatic and antifungal properties because of their acidic pH. They are effective against *P. aeruginosa, S. aureus, Proteus* spp. and *Candida*.

The aminoglycosides, polymyxin B, chloramphenicol and acetic acid are potentially ototoxic, the greatest risk of ototoxicity being associated with use for more than 7 days and use in a dry middle ear space. The quinolones have no known ototoxicity. With the availability of these drugs, the use of ototoxic preparations in patients with a tympanic membrane perforation should be reserved for cases with culture of an organism resistant to quinolones. Ototoxicity associated with topical use of antifungal agents has not been reported.

Administration of topical antiseptic agents can be painful, especially when applied to inflamed mucosa, because of their low pH. Discomfort can also occur with use of topical agents that are cold or contain alcohol.

The topical aminoglycosides, especially neomycin, can cause a contact dermatitis. This manifests as erythema with swelling and itching of the external ear canal and can easily be confused with unresponsive otitis externa.

CHRONIC SUPPURATIVE OTITIS MEDIA (CSOM)

CSOM is characterised by chronic infection of the middle ear and mastoid and a non-intact tympanic membrane. CSOM may occur with or without cholesteatoma.

The definitive treatment of CSOM is by surgery (tympanoplasty and/or mastoidectomy) for which the patient should be referred to an otorhinolaryngologist. However, initial treatment by ear toilet and ototopical agents is necessary to prepare the ear for surgery. This can be started before the patient is referred.

Topical antibiotics and antiseptics are the mainstay of pharmacological treatment. An antibiotic-steroid combination may be used if granulation tissue is present. Systemic antibiotics are indicated only when complications are present.

The presence of systemic symptoms, otalgia, post-auricular tenderness, facial palsy or vertigo suggests a complication and warrants urgent referral.

OTITIS EXTERNA

Otitis externa is a bacterial or fungal infection of the skin of the external ear canal. *P. aeruginosa* is the most common bacterial pathogen. Fungal otitis externa usually arises as a secondary condition after treatment with topical antibiotic drops.

Otitis externa can be very painful, with inflammation and oedema of the ear canal skin. It can be difficult to distinguish from acute mastoiditis. The lack of post-auricular erythema and tenderness in otitis externa can be used to differentiate between the two conditions.

Ear toilet, together with topical antibiotic and steroid drops, is the first-line treatment of choice for uncomplicated, diffuse, acute otitis externa. There is no evidence that systemic antibiotics, alone or in combination with topical antibiotics, improve outcome compared with topical antibiotics alone. However, systemic antibiotics are indicated for the more serious manifestations of this condition, such as periauricular cellulitis and malignant otitis externa. The use of a topical steroid to reduce the inflammation has a significant effect on the pain.

The ear canal may be swollen to such an extent that ear toilet and the administration of eardrops are not possible. In this case, an ear wick coated with a combination of antibiotic, steroid and antifungal cream should be inserted into the ear canal for a period of 1 - 2 days until the swelling has subsided. The ear canal can then be cleaned and topical antibiotic and steroid drops administered.

Analgesics should be prescribed for the pain. Non-steroidal anti-inflammatory drugs (NSAIDs) may be required if the pain is severe.

In the case of a fungal otitis externa, the ear canal should be cleaned thoroughly and either 1% acetic acid drops in alcohol prescribed or the ear canal filled with a topical antifungal cream. Clotrimazole is the most effective antifungal agent in eradicating *Candida* and *Aspergillus*.

The presence of otitis externa in a diabetic patient, especially if associated with granulation tissue in the ear canal or facial palsy, is strongly suggestive of malignant (necrotising) otitis externa, which requires urgent referral.

ACUTE OTITIS MEDIA WITH PERFORATION OF THE TYMPANIC MEMBRANE

Acute otitis media is a common condition, especially in children under the age of 5 years. Otorrhoea may occur after perforation of the tympanic membrane, with the onset of otorrhoea usually being accompanied by relief of otalgia. The most common causative organisms are *S. pneumoniae, H. influenzae* and *M. catarrhalis*.

Ear toilet and antibiotics directed at the causative pathogens is the treatment of choice, while fever and otalgia should be treated symptomatically. Amoxicillin in high doses (80 - 90 mg/kg/day) is the preferred first-line antibiotic for acute otitis media. The use of an antibiotic eardrop in acute otitis media with a perforated tympanic membrane may result in more rapid resolution and prevent secondary infection by organisms from the external ear canal.

A pus swab may be taken from the ear canal, but the result should be interpreted with caution, as commen-

sal organisms from the external ear canal may be cultured.

POST-VENTILATION TUBE OTORRHOEA

Infection resulting in otorrhoea is not uncommon in children with ventilation tubes (grommets). The bacteria usually responsible for acute otitis media (*S. pneumoniae, H. influenzae* and *M. catarrhalis*), as well as *P. aeruginosa* and *S. aureus,* are the most common pathogens cultured. The former organisms are more common in children under 3 years of age, while the latter organisms predominate in children over the age of 3 years. When the otorrhoea has become chronic, there may also be opportunistic infection by anaerobes and yeasts.

Initial treatment consists of taking a pus swab, ear toilet and administering topical antibiotic drops. Aminoglycoside eardrops should be avoided as they are ineffective against pneumococcus and are potentially ototoxic. A systemic antibiotic, such as amoxicillin, should also be given in the presence of an upper respiratory tract infection. Parents who smoke should be advised to do so outside the house, or preferably to stop smoking. Children should also be removed from day care, but this is usually not possible owing to social circumstances.

The patient should be referred for further management if the otorrhoea persists or becomes recurrent. This may include investigation for immunodeficiency, intravenous antibiotics and removal of the grommet.

CSF OTORRHOEA

Most cases of CSF otorrhoea have a traumatic aetiology, following a head injury or surgery to the skull base. In rare cases, the cause may be non-traumatic, such as congenital defects, neoplasms or CSOM.

In most cases the diagnosis can easily be established based on a history of clear, watery otorrhoea after a head injury or surgery to the skull base. Patients may present with a history of recurrent meningitis.

In most patients, watery fluid will be seen in the external ear canal. This can be confirmed as being CSF by testing the fluid for the presence of glucose or beta2-transferrin. The latter test is preferred as it has a greater sensitivity and specificity, but it is not as widely available.

Patients with CSF otorrhoea should be referred for further management.

Further reading

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IN A NUTSHELL

In most patients with a discharging ear, the diagnosis can be made based on the history and clinical examination.

Ear toilet and ototopical agents are the mainstay of treatment of most infective causes of otorrhoea.

The definitive treatment of CSOM is surgical, but ear toilet and topical antibiotics or antiseptics are used to prepare the ear for surgery.

Acute diffuse bacterial otitis externa is treated with ear toilet, topical antibiotics and steroids, and analgesics.

Acute otitis media with perforation of the tympanic membrane is treated with ear toilet, systemic antibiotics and symptomatically. Topical antibiotic drops may also be helpful.

Post-ventilation tube otorrhoea should be treated with ear toilet, antibiotic eardrops and systemic antibiotics.

The presence of vertigo, facial palsy or systemic symptoms in a patient with otorrhoea warrants urgent referral.

CSF otorrhoea is usually post-traumatic. Patients should be referred for further management.