

# Otitis Externa: Adult & Pediatric

Ears, Eyes, Nose, Throat and Mouth

Clinical Decision Tools for RNs with Additional Authorized Practice [RN(AAP)s]

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## Background

Otitis externa (OE) is an inflammation of the external ear canal lining, with or without infection, and may include parts of the outer ear (Huether & Rodway, 2019). Otitis externa typically presents in two forms: 1) a benign painful infection or inflammation of the outer canal, and 2) malignant (necrotizing) OE, a potentially lethal form that usually occurs in immunocompromised or clients with diabetes (Huether & Rodway, 2019).

Otitis externa is also called swimmer's ear, tropical ear, or external ear infection (Earwood, Rogers, & Rathjen, 2018).

## Immediate Consultation Requirements

The RN(AAP) should seek immediate consultation from a physician/NP when any of the following circumstances exist:

- fever > 39°C oral;
- suspicion of malignant OE;
- suspicion of fungal OE;
- severe pain;
- extensive cervical lymphadenopathy;
- mastoid process erythema, tenderness, swelling with fever, protrusion of pinna, facial nerve palsy/palsies;
- treatment failure or recurrence of OE which may be indicative of chronic OE;
- local cellulitis;
- parotitis;
- vertigo; and/or
- tenderness of the temporomandibular joint or pain with chewing (Earwood et al., 2018; Interprofessional Advisory Group [IPAG], personal communication August 28, 2019; Porter, Dunphy, & Reinoso, 2019).

## Characteristics

Further information about the various types and causes of OE is as follows:

Acute OE
<ul style="list-style-type: none"> <li>• most common presentation;</li> <li>• usually caused by a bacterial infection due to alterations in the normal acidic environment, lack of cerumen, and/or trauma to the skin covering the external ear canal;</li> <li>• ninety percent of cases are bacterial with <i>Pseudomonas</i>, <i>Escherichia coli</i>, and <i>Staphylococcus aureus</i> as pathogens;</li> <li>• less commonly, it can be the result of a fungal infection with <i>Aspergillus niger</i>, <i>Malassezia pachydermatis</i>, and <i>Candida albicans</i> being the most common organisms.</li> </ul>
Chronic OE
<ul style="list-style-type: none"> <li>• infection lasting greater than three months or more than four episodes of acute OE per year, is typically caused by atopic dermatitis or psoriasis and would be considered chronic;</li> <li>• may result from incomplete resolution of an acute infection with continuous serous or exudative draining from the middle ear into the external ear canal (e.g., such as with tympanostomy tubes);</li> <li>• presentation is frequently bilateral; and</li> <li>• ear pain is rare.</li> </ul>
Malignant OE
<ul style="list-style-type: none"> <li>• malignant (necrotizing) OE is a potentially lethal form that usually occurs in immunocompromised or diabetic clients but is rare in children;</li> <li>• the infection, most commonly <i>Pseudomonas aeruginosa</i>, begins in the skin of the external ear canal and may spread to the soft tissues, cartilage, and bone in the temporal region or base of the skull;</li> <li>• multiple cranial nerves may be involved; and</li> <li>• it may be accompanied by a fever and systemic manifestations of infection.</li> </ul>

(Anti-infective Review Panel, 2019; Earwood et al., 2018; Huether & Rodway, 2019; Portet et al., 2019; Wiegand, Berner, Schneider, Lunderhausen, & Dietz, 2019)

## Predisposing and Risk Factors

Predisposing and risk factors for OE include:

- prolonged use of hearing aids, ear phones, or ear plugs;
- ear canal stenosis;
- sebaceous cysts;
- ear canal trauma;
- manual picking of ear canal;
- foreign body in ear canal;
- swimming;
- inadequate cerumen production;

- history of seborrheic dermatitis or atopic dermatitis; previous ear infections;
- skin allergies (e.g., sensitivities to hair sprays, dyes);
- use of cotton-tipped applicators;
- excess moisture (e.g., swimming, frequent bathing);
- environmental changes (e.g., increase in temperature and/or humidity);
- immunocompromised conditions, poorly controlled diabetes; and/or
- corticosteroid use (Porter et al., 2019).

## Health History and Physical Exam

### Subjective Findings

The circumstances of the presenting complaint should be determined. These include:

- ear pain (otalgia) and/or itchiness,
- purulent discharge from canal (cheesy white, greenish blue, or grey),
- recent exposure to water or mechanical trauma,
- changes in hearing or feelings of fullness in the ear may be present,
- unilateral headache may be present,
- tinnitus,
- jaw pain or pain with chewing in severe cases, and/or
- vertigo (Porter et al., 2019; Wiegand et al., 2019).

### Objective Findings

The signs and symptoms of OE may include:

- ear canal edema, erythema, or both;
- erythema of tympanic membrane (TM) or perforation;
- canal obstruction;
- aural discharge may occur and may be serous or purulent;
- auricular cellulitis;
- parotitis;
- enlarged cervical lymph nodes;
- temperature, which may be  $> 39^{\circ}\text{C}$  oral in malignant OE, but uncommon in acute OE;
- pain with pinna/tragus manipulation or pressure, this may be used to differentiate OE from acute otitis media with otorrhea;
- necrosis or granulation of canal skin in malignant OE;
- examine the skin for other dermatologic manifestations (such as eczema, psoriasis, etc.) (Anti-infective Review Panel, 2019; Earwood et al., 2018; Porter et al., 2019).

Physical findings of chronic OE are identified by Wiegand and colleagues (2019) and are:

- erythema of external canal;
- lichenification of the skin of the external canal;

- if due to fungal infection, whitish cotton-like strands in the ear canal; canal appearance of “wet newspaper” with grey or slightly black colour;
- discomfort and pain are rare; if present, are usually mild;
- ear manipulation may be painful, especially pressure on tragus or movement of auricle; and/or
- cervical lymphadenopathy may be present with severe disease and extra-canal manifestations.

## Differential Diagnosis

The following should be considered as part of the differential diagnosis:

- barotrauma,
- furunculosis,
- eustachian tube dysfunction,
- foreign body in external ear canal,
- otitis media,
- atopic or contact dermatitis,
- chronic suppurative otitis media,
- otomycosis,
- psoriasis,
- cellulitis of auricle,
- cholesteatoma,
- myringitis,
- malignant OE,
- mastoiditis,
- referred pain (e.g., pharyngitis),
- Ramsay Hunt syndrome (herpes zoster oticus), and/or
- trauma to the ear (e.g., blunt trauma, frostbite) (Earwood et al., 2018; Porter et al., 2019).

## Making the Diagnosis

The diagnosis is usually made clinically based on health history and physical exam.

## Investigations and Diagnostic Tests

Investigations and diagnostic tests are not typically required if the history and physical examination support the diagnosis of OE (Porter et al., 2019). Obtaining a culture swab of fluid in the external ear canal can help guide treatment if the client does not respond to empiric therapy or when treating chronic otitis media (Porter et al., 2019). Moreover, culture and sensitivities are beneficial when treating immunocompromised clients as the condition may be caused by a rare pathogen (Porter et al., 2019).

# Management and Interventions

## Goals of Treatment

The primary goals of immediate treatment are to relieve pain, prevent recurrence, and eradicate infection (Porter et al., 2019).

## Non-Pharmacological Interventions

The RN(AAP) should recommend, as appropriate, the application of heat or cold to the outer ear, which may help with discomfort (Porter et al., 2019). Additionally, instructions on removing debris from the ear canal are as follows:

1. Clean the outer ear and the canal with a normal saline-soaked cotton ball or gauze and gently debride the area of debris and exudate.
2. If the ear canal is significantly swollen, an ear wick can be made by gently twisting a 2.5 centimetre length of absorbent cotton or gauze and threading it into the canal. Left in place, the ear wick will facilitate administration of medicated drops to the distal part of the canal (Anti-infective Review Panel, 2019; Porter et al., 2019). The wick will eventually fall out as edema subsides or can be removed after two to three days and the drops instilled directly into the ear canal (Anti-infective Review Panel, 2019; Porter et al., 2019).

## Pharmacological Interventions

The pharmacological interventions recommended for the treatment of OE are in accordance with the *Anti-infective Guidelines for Community-acquired Infections* (Anti-infective Review Panel, 2019), *Inflammatory and Infectious Disorders of the Ear* (Porter et al., 2019), *RxFiles: Drug Comparison Charts* (RxFiles Academic Detailing Program, 2021) and *CPS drug information* (Canadian Pharmacists Association 2021).

## Analgesics and Antipyretics

	Drug	Dose	Route	Frequency	Duration
<b>Pediatric</b>					
	Acetaminophen	10-15 mg/kg/dose (maximum daily dose of 75 mg/kg/day)	p.o.	q4-6h prn	5-7 days
AND/ OR	Ibuprofen	5-10 mg/kg/dose (maximum daily dose of 40 mg/kg/day)	p.o.	6-8h prn	5-7 days

	Drug	Dose	Route	Frequency	Duration
<b>Adult</b>					
	Acetaminophen	500-1000 mg  (maximum daily dose of 4 g/day)	p.o.	q4-6h prn	5-7 days
AND/ OR	Ibuprofen (preferred)	400 mg (maximum daily dose of 1600 mg/day)	p.o.	6-8h prn	5-7 days

### Topical Antibiotics for Acute Bacterial OE

If TM perforation cannot be ruled out, then management should proceed as if there is a perforated TM. First line treatment of bacterial OE is empiric topical antibiotics. Oral antibiotics are not typically required for uncomplicated cases.

	Drug	Dose	Route	Frequency	Duration
<b>Pediatric (≥ 6 months of age) and Adults</b>					
	Polysporin (1000U polymyxin B and 0.025 mg gramicidin per mL) eye and ear drops	1-2 drops to affected ear	topical	q.i.d.	7 days
<b>Pediatric (≥ 6 months of age) and Adults (unable to rule out ruptured TM)</b>					
	Ciprofloxacin and dexamethasone (Ciprodex)	4 drops to affected ear	topical	b.i.d.	7 days

### Client and Caregiver Education

The RN(AAP) provides client and caregiver education as follows:

- Counsel about the appropriate use of medications (if possible, have another person instill drops and clean the ear).
- Counsel about proper ear hygiene before instilling medications.
- Advise about preventing recurrent irritation (e.g., client should not use cotton-tipped applicators in the ears). Counsel that a small amount of earwax is necessary to prevent infection in the external ear canal.

- Recommend proper drying of ears after swimming using warm air from a hair dryer, tilting head to allow drainage, or in the presence of an intact TM, instilling two to three drops of a solution of three percent acetic acid (mix 100 mL of white vinegar and 45 mL of water).
- Recommend the use of ear plugs while swimming, bathing, or showering.
- Counsel about proper hygiene of hearing aids and ear plugs.
- Keep ear dry and avoid swimming, immersion of ear under water, and water sports for four to six weeks after symptoms subside (Anti-infective Review Panel, 2019; Porter et al., 2019).

## Monitoring and Follow-Up

The client should be advised to follow-up if symptoms do not begin to subside after 48 hours to confirm the diagnosis of acute OE and to rule out other causes of illness. The RN(AAP) should advise the client to stop treatment immediately if tinnitus, hearing loss, vertigo, or balance issues occur and to seek care. The client should be advised to schedule a follow-up visit after one week of treatment to assess treatment effectiveness or sooner if pain increases or if fever develops despite therapy. If an ear wick is used, remove after 48-72 hours and reassess (Anti-infective Review Panel, 2019; Porter et al., 2019).

## Complications

The following complications may be associated with acute OE:

- dermatitis medicamentosa;
- TM perforation;
- conductive hearing loss due to edema of external ear canal;
- opportunistic bacterial or fungal infection may complicate chronic OE;
- fungal involvement is uncommon in acute OE but may be more common in chronic OE or after treatment with topical antibiotics (or less often, systemic antibiotics);
- cranial nerve palsies (most commonly CN VII, and IX, X, XI, and XII) if untreated;
- severe furunculosis or cellulitis within ear canal;
- inadequate treatment can lead to mastoiditis, parotitis, meningitis, or osteomyelitis of the temporal bone or base of skull (Anti-infective Review Panel, 2019; Huether et al., 2019; Porter et al., 2019).

## Referral

Refer to a physician/NP if client presentation is consistent with those identified in the *Immediate Consultation Requirements* section, if the presence of ear wax or debris obstructs penetration of topical medication, or if the client's pain is not managed with simple analgesics (e.g., acetaminophen, ibuprofen) (IPAG, personal communication August 28, 2019).

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