



# Otitis Externa And External Ear Conditions



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JUH

# Lecture Notes

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Introduction

Acute Otitis externa

Furunculosis

Chronic Otitis Externa

Erysipelas

Otomycosis

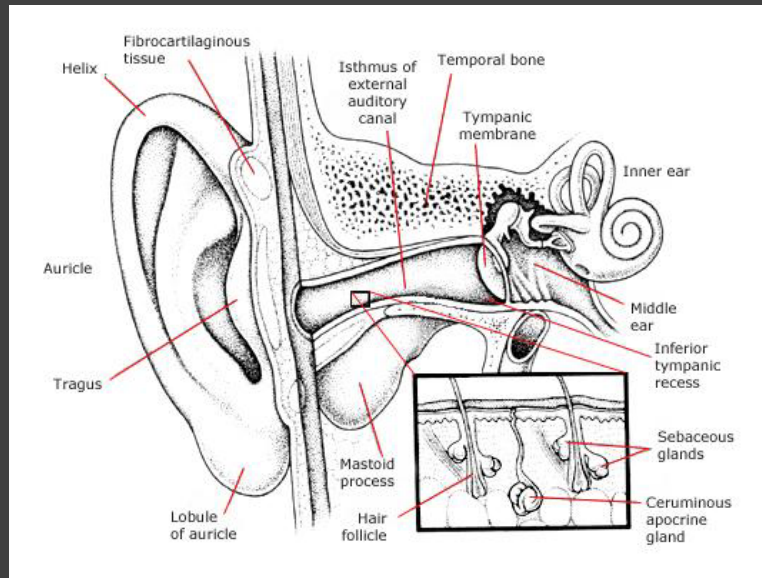
Necrotizing (malignant) External Otitis(NEO)

Perichondritis

Erysipelas

Summery & recommendations

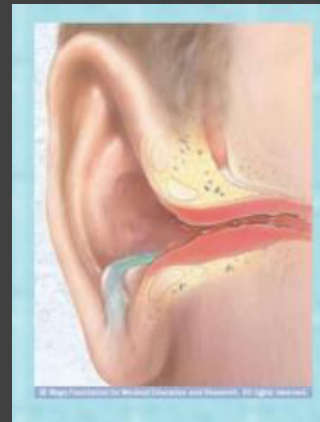
# Introduction



# Otitis Externa (OE)

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- Otitis externa (OE) is an inflammation or infection of the external auditory canal (EAC), the auricle, or both.



# Classification

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**Acute diffuse OE** – the most common form of OE,

**Acute localized OE** – This condition, also known as furunculosis, is associated with infection of a hair follicle

**Chronic OE** – duration (>6 weeks)

**Eczematous (eczematoid) OE**

**Necrotizing (malignant) OE**

**Otomycosis**

# EPIDEMIOLOGY

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External otitis can occur in all age groups.

Annual rates of ambulatory care visits in the United States for external otitis are highest during childhood and decrease with age affecting approximately 10 percent during lifetime.

- ● 7 percent ages 0 to 4 years
- ● 19 percent ages 5 to 9 years
- ● 16 percent ages 10 to 14 years
- ● 9 percent ages 15 to 19 years
- ● 5 percent ages ≥20 years

External otitis is more likely to occur in the summer, compared to winter months .

OE affects both sexes equally.

No racial predilection has been established.

# PATHOGENESIS

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Breakdown of the skin-cerumen barrier is the first step in the pathogenesis of external otitis.

Inflammation and edema of the skin then leads to pruritus and obstruction.

The pruritus prompts scratching that may create further injury.

This sequence of events alters the quality and amount of cerumen produced, impairs epithelial migration, and increases the pH of the ear canal.

The resulting dark, warm, alkaline, moist ear canal becomes an ideal breeding ground for numerous organisms.

# RISK FACTORS

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Swimming or other water exposure.

Any trauma.

Devices that occlude the ear canal.

Allergic contact dermatitis .

Dermatologic conditions.

Prior radiation therapy.



# MICROBIOLOGY

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Staphylococci are the most common bacteria (63 percent) to inhabit the external ear, with S. auricularis (22 percent) and S. epidermidis (15 percent) being the most common species.

The most common pathogenic organisms responsible for external otitis are P. aeruginosa (38 percent), S. epidermidis (9 percent), and S. aureus (8 percent) .

Anaerobic pathogens are present in 4 to 25 percent of patients; bacteroides and peptostreptococci are the most frequently encountered anaerobic organisms .

Some patients may have mixed aerobic and anaerobic infection.

Fungal infection accounts for two to ten percent of cases of external otitis, and most frequently occurs after treatment of bacterial infection. Candidal infection occurs more commonly in patients who use hearing aids .

Polymicrobial disease occurs in up to one-third of cases

# Signs and Symptoms

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## history and physical examination :

- Otalgia
  - Tenderness on palpation or manipulation (tragus sign)
  - Ear fullness
  - Conductive hearing loss
  
  - Erythema of meatus and canal
- Swelling and obstruction of canal
- Crusting and discharge



# staging

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Mild disease : minor discomfort and pruritus. There is minimal canal edema.

**Moderate** : intermediate degree of pain and pruritus. The canal is partially occluded. Advanced disease is characterized by intense pain. The canal is completely occluded.

**Severe** : severe pain, The canal is completely occluded, there is auricular erythema, periauricular erythema, possibly adenopathy, and fever

# Guidelines

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(AAO-HNSF) clinical practice :

**Differentiate** diffuse acute OE from other possible causes of otalgia, otorrhea, and inflammation of the EAC.

Assess patients with diffuse acute OE for factors that may **modify** therapeutic management (eg, non-intact tympanic membrane, immunocompromised state).

Assess for **pain** in patients with acute OE; base the analgesia recommendation on the patient's pain severity.

Administer **topical** medications as initial therapy for diffuse, uncomplicated acute OE.

# Guidelines

Do not administer **systemic antimicrobial agents** as initial therapy for diffuse, uncomplicated acute OE;

**Instruct** patients on how to administer topical drops; perform an aural toilet, place a wick, or both, when the ear canal is obstructed.

Use a **non-ototoxic** topical agent in patients with a known or suspected perforation of the tympanic membrane (eg, tympanostomy tube).

Confirm the diagnosis of acute OE and reassess the differential diagnosis within 48-72 hours in cases refractory to the initial therapy.

# Treatment

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- Thoroughly clean the ear canal
- Treat inflammation and infection
- Control pain
- Culture severe or recalcitrant cases (and consider alternative diagnoses)
- Avoid promoting factor

# Topical preparations

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Including **acidifying solutions**, **antiseptics**, **antibiotics**, and **anti-inflammatory** drugs

A systematic review found that topical antimicrobials increased absolute clinical cure, compared to placebo, by 46 percent .

The review also found no significant difference comparing topical antibiotics with topical antiseptics, or topical antibiotics with topical antibiotic/steroid preparations.

# Acidifying solutions

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P. aeruginosa and S. aureus readily grow in environments with a pH of 6.5 to 7.3; they grow less well at a lower pH .

Thus, simply acidifying the ear canal inhibits bacterial growth.

Commonly used acidifying solutions are acetic acid, hydrochloric acid, salicylic acid, boric acid, sulfuric acid, and citric acid





# Antiseptics

bacteriostatic agents.

they make the ear canal less habitable for bacteria and provide mechanical debridement.

in vitro antimicrobial activity against a number of pathogens

include alcohol, gentian violet, m-cresyl acetate, thimerosal, and thymol



# Topical corticosteroids

decrease inflammation, pruritus relief and decreased pain.

One randomized study compared acetic acid, acetic acid plus steroid, and antibiotic plus steroid (neomycin sulfate plus polymyxin B sulfate plus dexamethasone phosphate) in 213 adults with otitis externa .



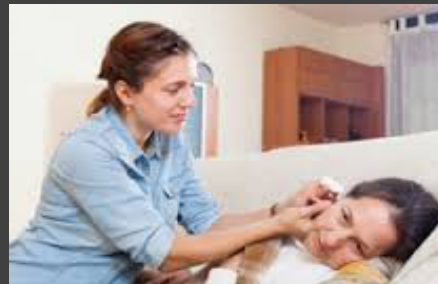
Time to symptom resolution was longer for acetic acid alone (median 8.0 days) compared to acetic acid plus steroids (7.0 days) or antibiotic plus steroids (6.0 days). Cure rates at 14 days were significantly higher for steroids plus acetic acid and for steroids plus antibiotic compared to acetic acid alone.

# Topical antibiotics

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Many topical antibiotic solutions are now available for treatment of otitis externa

Several factors should be considered when selecting an otological antibiotic: coverage of expected pathogens , emergence of drug resistance , allergy sensitization, and possible ototoxicity .



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Use of **aminoglycoside** antibiotic eardrops in the presence of a perforation or ventilation tube may cause problems. ( controversial) .

**Fluoroquinolones are not associated with ototoxicity, and ofloxacin is safe in cases of a perforated tympanic membrane.**

A German meta-analysis found a trend suggesting the superiority of quinolone monotherapy to classic combination regimens comprising a nonquinolone antibiotic plus a steroid.

# Choice of topical agent

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Choosing the proper ototopical agent is difficult

The choice frequently becomes a personal one based upon clinical experience.

The use of a non-antibiotic topical agent alone, combined with aural toilet may be appropriate for patients with *mild or moderate* disease .

Several prospective, randomized studies have found that patients treated with or without antibiotic-containing regimens had similar cure rates .

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For *moderate* disease (confined to the ear), the ideal ototopical medication should be **acidic and contain a steroid, an antiseptic, and an antibiotic.**

The antibiotic should have good **S. aureus** and **P. aeruginosa** coverage. There should be limited risk of allergic reaction to any of the formula agents.

Cipro HC perhaps best fits all criteria and only needs to be dosed twice daily. Other reasonable choices are **Cortisporin, Tobradex, and Pred-G.**

# Systemic antibiotics

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A randomized trial in patients with external otitis (n=105) seen in general practices in Australia compared a topical ointment (containing an antifungal, a steroid, and two antibiotics) plus placebo with topical ointment plus oral trimethoprim-sulfamethoxazole. There was no difference in a clinical response score at day two to four or day five to six.

Topical therapy for external otitis delivers a high concentration of antimicrobial to the infected tissue, and results in prompt symptom response and bacteriologic cure, with few side effects.



m6261104 [RM] © www.visualpharmac.com

# Ear packing :

\* Narrowing of EAM

\* Facilitate Topical Agents Absorption





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Systemic antibiotics may increase rates of infection resistance and recurrence possibly due to lower antimicrobial concentrations at the site of infection.

When systemic antibiotics are necessary, a quinolone antibiotic, such as ofloxacin or ciprofloxacin, is recommended for coverage of P. aeruginosa and S. aureus

Systemic antibiotics, supplementing topical therapy, should be used in patients with diabetes, immunodeficiency, or history of radiation to the ear, and in patients with severe external otitis whose infection extends beyond the external ear canal

## Avoiding promoting factors

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**Don't put anything smaller than your elbow in your ear**

# Avoiding promoting factors

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Eliminate any self-inflicted trauma to the ear canal, such as may occur with the use of cotton swabs or the insertion of objects

Avoid frequent washing of the ears with soap; this leaves an alkaline residue that neutralizes the acidic pH of the EAC

Avoid swimming in polluted waters

Ensure that the ear canals are emptied of water after swimming or bathing; the use of a blow dryer on a low setting after swimming to dry the ear canal has been suggested as a preventive measure, though no studies have demonstrated this suggestion to be effective

Instill prophylactic eardrops after each exposure to water to assist in drying and acidifying the ear canal; a combination of 70% isopropyl alcohol and acetic acid in a 2:1 ratio may be used

# Culture?

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Empiric treatment is usually sufficient and less costly than culture.

Cultures are reserved for patients with severe external otitis associated with periauricular cellulitis, lymphadenopathy, or fever.



Cultures should also be considered in patients who are immunocompromised or who have not responded to treatment within about three days.

# Furunculosis

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Acute localized infection

Lateral 1/3 of posterosuperior canal

Obstructed apopilosebaceous unit

Pathogen: S. aureus



# Furunculosis: symptoms&Signs

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Localized pain

Pruritus

Hearing loss

Edema

Erythema

Tenderness

Occasional fluctuance



# Furunculosis: Treatment

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Analgesics

Oral anti-staphylococcal antibiotics

Incision and drainage reserved for localized abscess

IV antibiotics for soft tissue extension!

## generalized recurrent furunculosis

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carriers of pathogenic strains of *S. aureus*,

additional therapy should be considered. Options include:

eradication therapy with nasal mupirocin;

eradication therapy with oral flucloxacillin for 14d

bacterial interference therapy: implanting a nonpathogenic strain of *S. aureus* (strain S02A is the most popular) to recolonize the nares and skin.



# Chronic Otitis Externa

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4 of every 1000 people per year

when the duration of the infection exceeds 6 weeks or when more than 4 episodes occur in 1 year

Bacterial, fungal, dermatological aetiologies

## COE: Symptoms

- Unrelenting pruritus
- Mild discomfort
- Dryness, Crusting, and flaking of canal skin

# COE: Signs

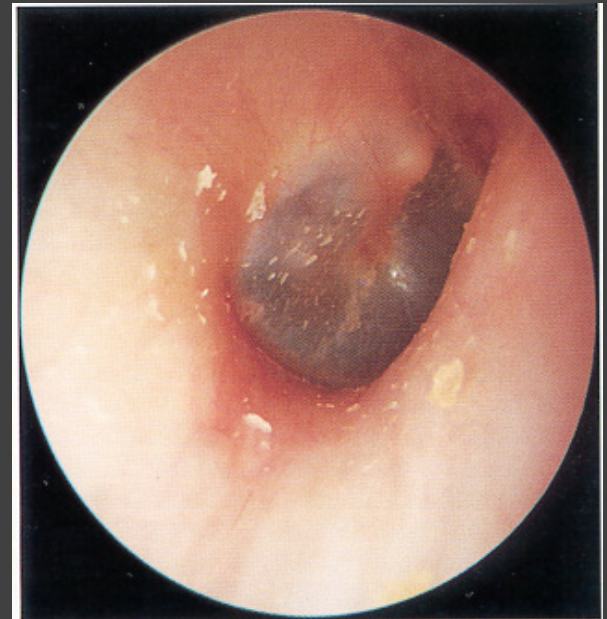
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Asteatosis

Dry, flaky skin

Hypertrophied skin

Mucopurulent otorrhoea (occasional)



# COE: Treatment

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Topical antibiotics, frequent cleanings

Topical Steroids

Surgical intervention

- Failure of medical treatment
- Goal is to enlarge and resurface the EAC

# Otomycosis

Exposure to warm, moist climates

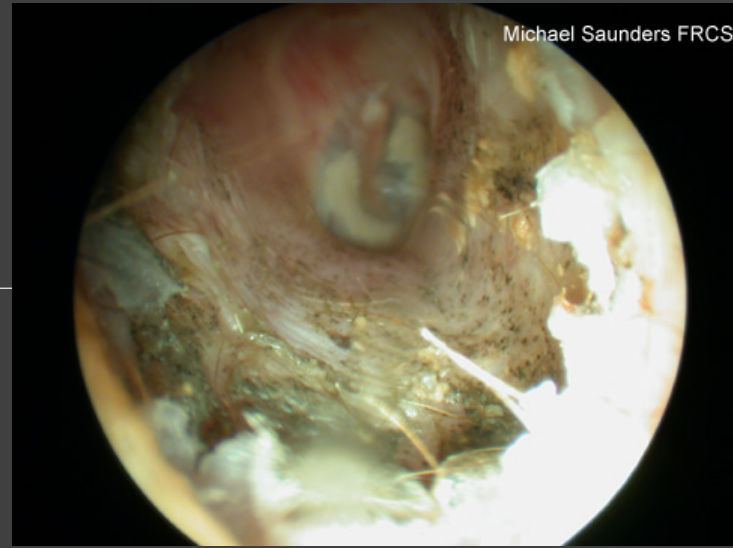
Hx of chronic use of antibiotic ear drops.

Fungal infection of EAC skin

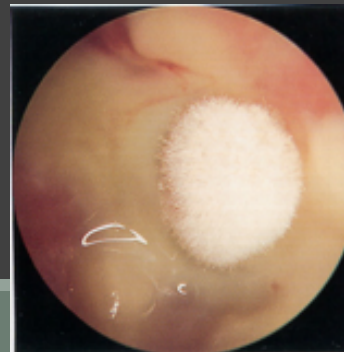
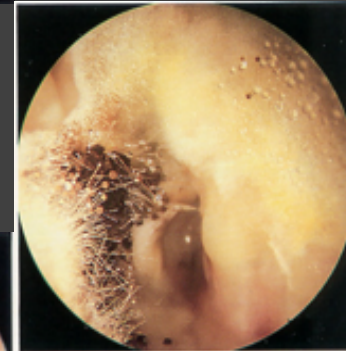
Primary or secondary

Most common organisms: Aspergillus and Candida

Michael Saunders FRCS



- Canal erythaema
- Mild oedema
- White, gray, green, yellow or black fungal debris
- Pruritus deep within the ear
- Otorrhoea
- Dull pain
- Hearing loss (obstructive)
- Tinnitus



# Otomycosis: Treatment

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Thorough cleaning and drying of canal

Topical antifungals (clotrimazole for eg., amphotericine B, oxytetracycline-polymyxin, and nystatin are very effective!)

Acidifying of the EAC with drops like 2% acetic acid, 3% boric acid.

# Necrotizing (malignant) External Otitis(NEO)

Potentially lethal infection of EAC and surrounding structures

*Pseudomonas aeruginosa*

Risk Factors:

- Diabetes Mellitus
- Elderly
- Immunocompromised state
- Human Immunodeficiency Virus (HIV)



# NEO: Signs & Symptoms

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Similar to Otitis Externa with

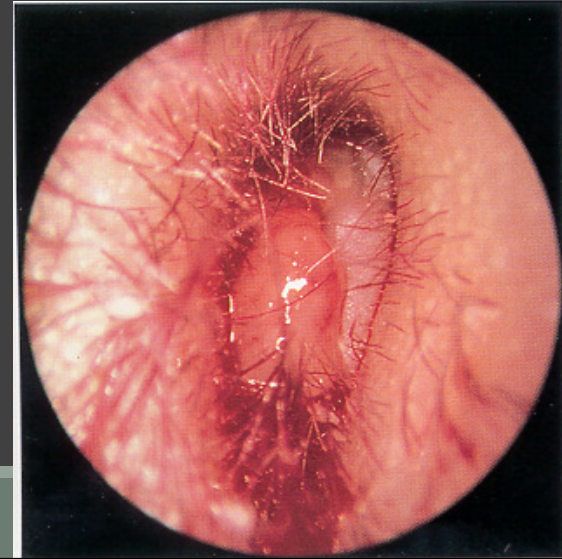
- Severe, unrelenting Ear Pain and Headache
- Persistent discharge
- Does not respond to topical medications
- Commonly associated with Diabetes Mellitus

Granulation tissue in posterior and inferior canal

- Pathognomonic for necrotizing otitis

Extra-auricular findings

- Cervical Lymphadenopathy
- Trismus (TMJ involvement)
- Facial Nerve Palsy or paralysis (Bell's Palsy)
  - Associated with poor prognosis





## Diagnosis

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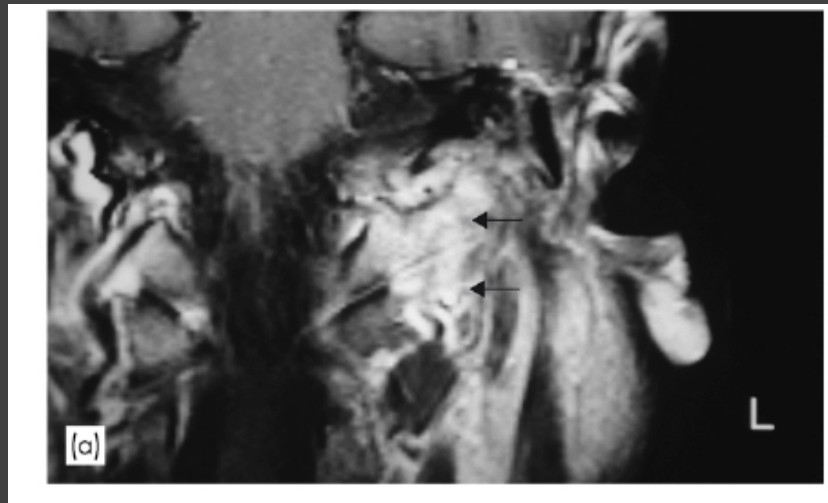
a clinical diagnosis

Labs; FBC, Culture of discharge, ESR, Serum glucose, Serum creatinine.

# Imaging

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- Radiology;
- CT, or MRI (ear), **Tc 99m** medronate methylene bone scanning, Ga 67 scintigraphy.
- SPECT



# NEO: Treatment

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meticulous glucose control

Aural toilet

Intravenous antibiotics for at least 6 weeks – with serial gallium scans monthly

Pain control

Use of topical agents controversial

Hyperbaric oxygen experimental

Surgical debridement for refractory cases

# NEO: Mortality

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overall mortality of 46 percent

dropped to below 10 percent with aggressive management & early diagnosis.

Cranial nerve palsy is a sign of advanced disease (mortality rates of up to 80 percent)

May recur up to 12 months after treatment

# Perichondritis/Chondritis

- Infection of perichondrium/cartilage
- Result of trauma to auricle
- May be spontaneous (overt diabetes)
- Usual pathogens include pseudomonas  
species and mixed flora



# Signs & Symptoms

- Pain over auricle and deep in canal
- fever
- Pruritus

- Tender auricle
- Induration
- Oedema
- erythaema
- Advanced cases
  - Crusting & weeping
  - Involvement of soft tissues



# Perichondritis: Treatment

- Aspiration of the pus
- Use antibiotics of gram-negative coverage, specifically antipseudomonals.
- Mild: debridement, topical & oral antibiotic
- Advanced: hospitalization, IV antibiotics
- Chronic: surgical intervention with excision of necrotic tissue and skin coverage

# Erysipelas

- Acute superficial cellulitis
- Group A, beta hemolytic streptococci
- Skin: bright red; well-demarcated, advancing margin
- Rapid treatment with oral or IV antibiotics if insufficient response

*strep pyogenes*





# Herpes Zoster Oticus (Ramsay Hunt Syndrome)

- J. Ramsay Hunt described in 1907
- Viral infection caused by varicella zoster
- Infection along one or more cranial nerve dermatomes (shingles).
  - herpes zoster of the pinna with otalgia.
  - facial paralysis
  - sensorineural hearing loss
  - A vesicular eruption of the concha of the pinna and the EAC.



# Symptoms

- Early: burning pain in one ear, headache, malaise and fever
- Late (3 to 7 days): vesicles, facial paralysis

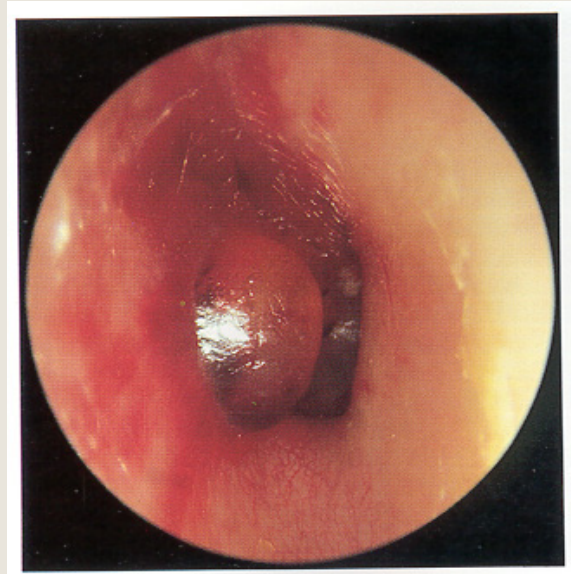
## Treatment

- Corneal protection
- Oral steroid taper (10 to 14 days)
- Antivirals (eg. Valacyclovir)
- Facial nerve decompression (controversial)!



# Bullous Myringitis

- Viral infection
- Confined to tympanic membrane
- Primarily involves younger children

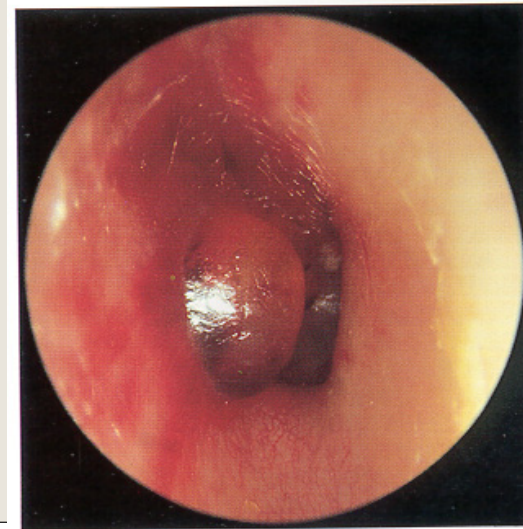


# Symptoms

- Sudden onset of severe pain
- No fever
- No hearing impairment
- Bloody otorrhoea (significant) if rupture

## Signs

- Inflammation limited to TM & nearby canal
- Multiple reddened, inflamed blebs.
- Hemorrhagic vesicles



# Bullous Myringitis: Treatment

- Self-limiting
- Analgesics
- Topical antibiotics to prevent secondary infection
- Incision of blebs is unnecessary

# Contact dermatitis

- Patients with persistent edema and erythema of the ear canal and auricle despite appropriate external otitis treatment may be experiencing an allergic reaction to their ototopical medication.
- type IV delayed hypersensitivity reactions
- Common ototopical agents causing allergic reactions are neomycin, benzocaine, and propylene glycol.

- Contact dermatitis should be considered if there has been a lack of response to otitis externa treatment over a one week period. Pruritus is the dominant symptom. Erythema intensifies and *classically extends to the inferior aspect of the conchal cartilage where drops often collect after application*
- Treatment begins by identifying and eliminating the causative agent; patch testing can help identify the allergen in difficult cases.



# Carcinoma of EAC

- considered any time there is an abnormal tissue growth in the ear canal or a lack of response to prolonged external otitis treatment
- Ear canal cancer occurs far less frequently than auricular cancer
- diagnosis of ear canal cancer typically is not made until the patient has failed protracted treatment for external otitis.
- Bloody otorrhea and mild pain are clues to the diagnosis. A friable ear canal lesion with surrounding purulence is another typical finding. Hearing loss and facial paralysis may develop.



# SUMMARY AND RECOMMENDATIONS

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The most common organisms causing acute external otitis are P. aeruginosa and S. aureus; disease is polymicrobial in one-third of cases.

External otitis presents with swelling of the canal, ear pain, pruritus, and discharge with findings of pain when the tragus is pushed or pinna pulled superiorly. Complete canal obstruction due to edema may be evident in advanced cases of external otitis. Periauricular erythema, lymphadenopathy, and fever are features of severe cases.

Treatment for otitis externa includes aural toilet, pain control, avoidance of ear trauma and water, and management of inflammation and infection. We recommend topical therapy for initial therapy in patients with mild and moderate disease (Grade 1A).

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Patients who fail to respond symptomatically within 48 to 72 hours should be questioned for compliance with medication application and water avoidance

Necrotizing otitis externa, or malignant external otitis, occurs when ear infection spreads to the skull base (soft tissue, cartilage, and bone of the temporal region and skull); patients with advanced age, diabetes, or immunocompromise are at greatest risk

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The differential diagnosis for bacterial external otitis includes fungal infection, contact dermatitis, chronic suppurative otitis media, and carcinoma.

**Squamous cell cancer involving the ear canal is rare, and requires aggressive treatment; it is suggested by blood otorrhea, a friable ear canal, and failure to respond to treatment for external otitis.**

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THANK YOU

