

Pediatric ENT Potpourri

Ears, Nose and Throat, Oh My!!

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Ear Pain

- Most common causes
 - Otitis media with effusion
 - Otitis externa
 - Acute otitis media
 - Eustachian tube dysfunction (ETD)
 - TMJ
 - Foreign body
 - Trauma

Otitis Media with Effusion (OME)

- Middle-ear fluid without signs of infection
- AKA "glue ear"
- Commonly follows acute otitis media (AOM)
- Less commonly occurs with ETD alone
- Can be chronic or acute



OME- Epidemiology

- Incidence peaks during the second year of life
- More prevalent in the winter months
- Episodes usually clear within a month

OME – Risk factors

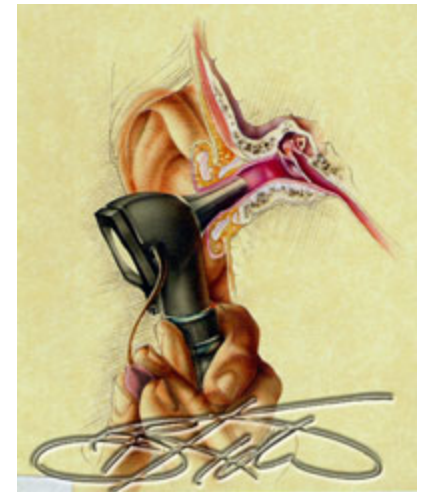
- Family history of otitis media or atopy
- Bottle feeding
- Daycare
- Exposure to tobacco smoke
- Structural abnormalities of the middle ear and eustachian tube

OME- Clinical Features

- Vertigo- “off-balance” or clumsier than usual
- Hearing loss
 - Speech and language delay
- Sensation of fullness in the ear
- Sleep disturbance

OME - Diagnosis

- Gold standard is pneumatic otoscopy
- Pneumatic otoscopy
 - TM is gray or translucent and in a neutral or retracted position
 - The fluid-filled middle ear prevents mobility of the TM
- Hearing test



OME-Management

- Most resolve without medical intervention
- The goal :
 - Eliminate the effusion
 - Restore hearing
 - Prevent future episodes

OME-Management

- The AAP/AAFP guideline is the basis for management of patients with prolonged (≥ 3 months) OME
- If at risk for speech, language, or learning problems
 - Surgical referral within 3 months

OME-Guidelines Based on Hearing Loss

- ≤ 20 dB without delays
 - Observe with hearing screens every 3 months
- 21- 39 dB
 - Observe or referred
- Hearing loss ≥ 40 dB
 - Refer

OME - Surgical Referral

- Hearing loss ≥ 21 dB
- Bilateral OME for ≥ 3 months
- Unilateral OME ≥ 6 months
- OME ≥ 12 months

OME - Surgical Referral

- Include the following on referral
 - Duration and laterality
 - Results of hearing tests
 - Child's history of AOM
 - Any suspected delays

OME-Medical Management

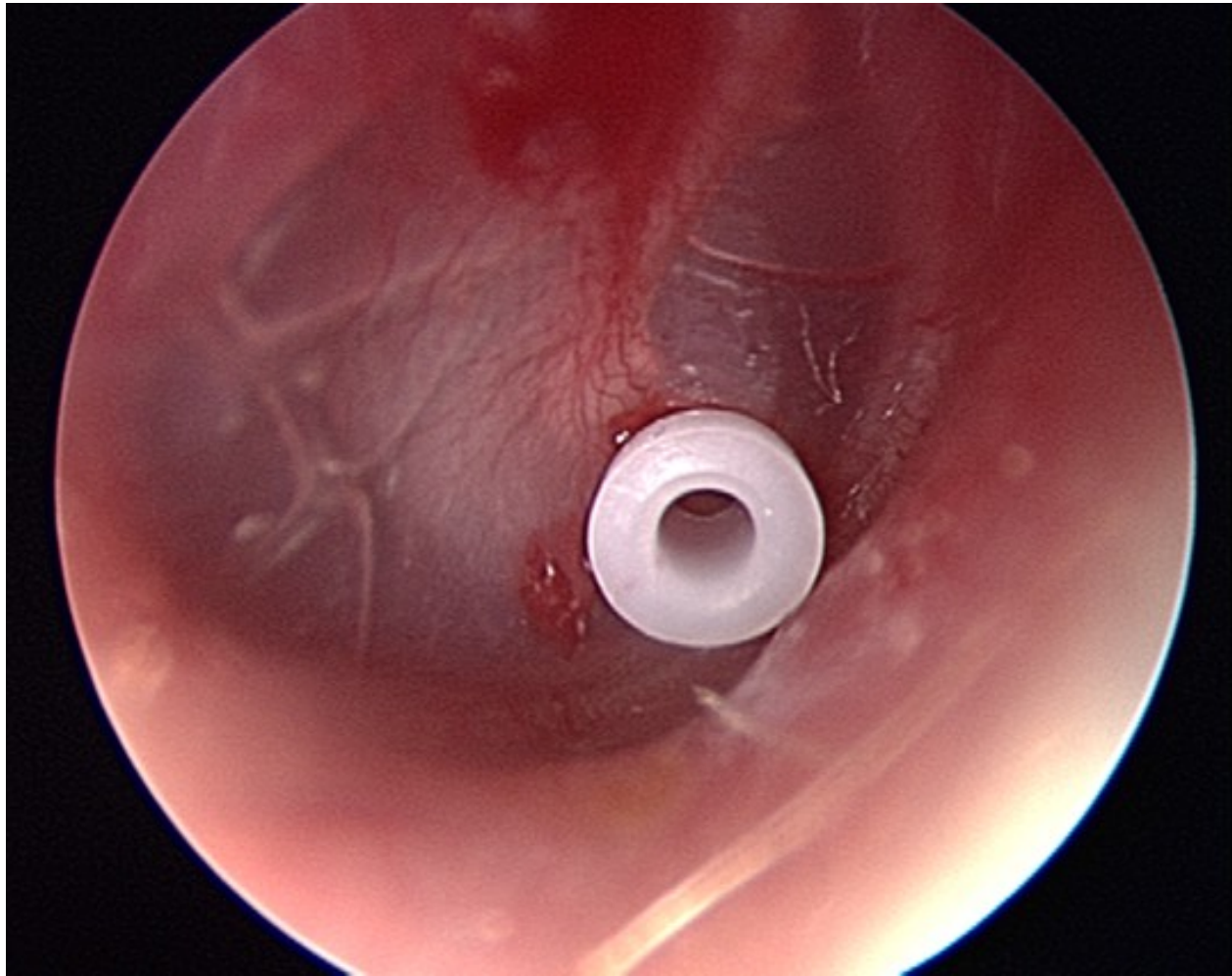
- Auto inflation
 - Opening the eustachian tube by raising intranasal pressure
 - Ear Popper
 - In use

OME-Pharmacological Treatment- AAP/AAFP guidelines

- Antihistamines, decongestants and intranasal corticosteroids **NOT** recommended
- A single 10- to 14-day course of Amoxil
 - Benefits are short lived

OME- Surgical Treatment

- Tympanostomy tubes
 - Ridding the middle ear of fluid
 - Restoring the health of the middle-ear
 - Improving hearing loss
 - Maintaining an air-filled middle-ear

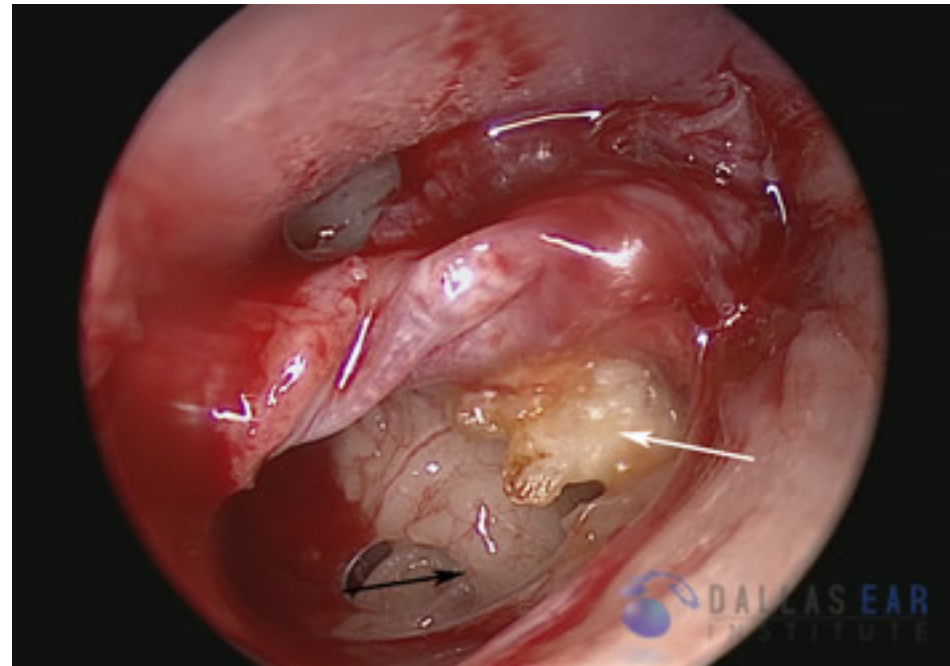


Tympanostomy Tubes (TT)- Studies versus Practice

- Studies
 - 32 % less time with OME during first year of follow-up
 - Mean hearing improved by 9 dB after first six months
- Practice
 - Parents & providers report almost immediate and often dramatic response
 - Rapid increase in speech as well as improvement in the quality of life

OME- Complications

- Cholesteatoma
 - Squamous debris accumulation within a retraction pocket
 - Can grow to envelop the ossicles



OME- Complications

- Tympanosclerosis
 - Characterized by whitish plaques in TM
 - Usually of no importance
 - May envelop the ossicles



Otitis Externa - Introduction

- Inflammation of the external auditory canal or auricle
- Causes
 - Infectious
 - Bacterial –Most common overall
 - Fungal
 - Allergic
 - Underlying dermal disease (psoriasis)



OE - Anatomy

- Lined with keratinizing squamous epithelium that is continually sloughed
- Cerumen and sloughed epithelium removed through epithelial migration

OE - Pathogenesis

- Breakdown of the skin/cerumen barrier
- Inflammation leads to obstruction & pruritus
- Itching › scratching
 - Alters the pH and creates an ideal breeding ground for infection

OE - Risk Factors

- Excessive cleaning or aggressive scratching
- Swimming
 - Excess moisture leads to maceration and breakdown of the skin
- Devices that occlude the ear canal



Stick me in
your ear...
you know you
want to...

OE - Microbiology

- Normally colonized with bacteria
- Most common organisms
 - *P. aeruginosa* and *S. aureus*
- Polymicrobial disease in up to 1/3
- Fungal infection in ~ 2-10%
 - Often occurs after treatment of bacterial infection

OE – Clinical Features

- Otalgia
- Pruritus
- Discharge
- Hearing loss



OE - Diagnosis

- Clinical Dx
- Pain with tragal pressure or auricular tugging
- Canal is typically edematous & erythematous
 - Debris may be yellow, brown, white, or gray
- The TM may be only partially visible

OE - Disease Staging

- Mild
 - Minor discomfort and pruritus
- Moderate
 - Intermediate degree of pain and pruritus and partially occluded canal

OE - Disease Staging

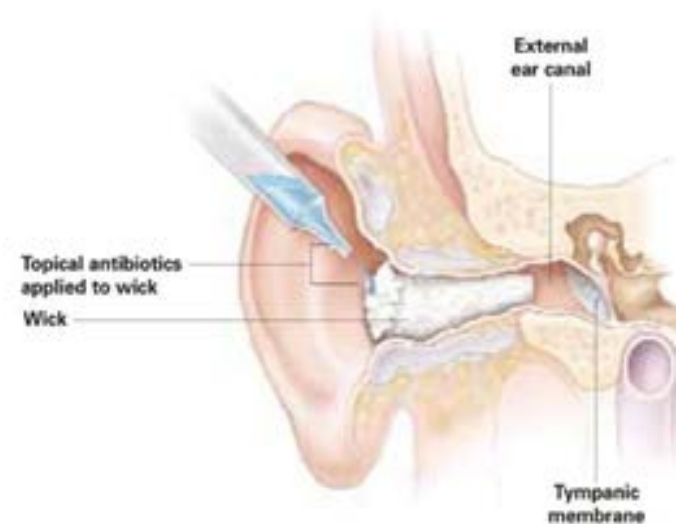
- **Advanced**
 - Intense pain with complete occlusion and possibly auricular erythema
- **Severe**
 - Severe pain with complete occlusion and auricular erythema, periauricular erythema, adenopathy and fever

OE - Treatment

- 5 fundamental steps
 - Thoroughly clean the ear canal
 - Treat inflammation and infection
 - Control pain
 - Culture severe or recalcitrant cases (and consider alternative diagnoses)
 - Avoid promoting factors
- Ear cleaning- **most important**
 - Facilitates healing and enhances penetration of ear drops

OE - Treatment

- Mild disease or moderate disease
 - Ear lavage and suction and a topical agent
- Advanced or severe disease
 - Place wick
 - Allow meds to get in
 - Topical antibiotic & possibly systemic



OE - Pharmacotherapy

- First line : Gentamicin or Tobramycin 4 gtts TID-QID x 7 days
- Second line: Ciprofloxacin or Ofloxacin 4 gtts BID x 7days
 - Preferably with steroid

OE – Complications & Concerns

- Consider ruptured TM
 - Secondary to AOM
- Chronic or recurrent OE
- Otomycosis
 - Common cause of treatment failure
- Neomycin allergy occurs in 35 %

OE - Complications

- Necrotizing OE (malignant OE)
 - Infection spreads to the soft tissue, cartilage, and bone of the skull
 - Can lead to death from septic embolism
 - VERY rare in kids
 - Most due to *P. aeruginosa*; otorrhea common
 - Severe pain out of proportion to exam findings



Fig. 1. Malignant otitis externa with ecthyma gangrenosum patch over scalp (arrow).

OE - Prognosis & Follow Up

- Excellent in acute situation
- Follow up in 7 days or sooner if symptoms not improving
- Within 24 hours if wick placed

Acute Otitis Media

- Presence of fluid in the middle ear
 - Accompanied by
 - Acute signs of illness
 - Signs or symptoms of middle ear inflammation

AOM- Introduction

- The epidemiology and microbiology of AOM have been influenced by :
 - Pneumococcal conjugate vaccine (2000)
 - AAP/AAFP guidelines in 2004
 - CDC push to avoid overuse of antibiotics

AOM - Epidemiology

- Most frequent diagnosis in sick children
- Most common reason for use of antibiotics
- Occurs at all ages
 - Most common in infancy

AOM- Incidence

- 60-80 % of kids have at least one episode by one year
- Slightly more common in boys
- Infrequent in school-age children and adolescents
- Immunization of infants with PCV7 has decreased the incidence
 - Anywhere from 12-43 % according to post marketing studies

AOM - Risk Factors

- Age
 - peaks 6 -18 months
- Family history
- Day care
- Lack of breastfeeding
- Tobacco smoke and air pollution

AOM - Risk Factors

- Pacifier use
- Developing areas
- Social and economic conditions
- Season
- Altered host defenses & underlying disease



AOM – Pathogenesis

Sequence of Events

- Preceding event, usually URI
- Leads to edema of the respiratory mucosa
- Edema obstructs the eustachian tube
- Obstruction causes build up of secretions
- Viruses & bacteria enter the middle ear

AOM – Bacterial Microbiology

- Most caused by
 - Strep pneumo, H. influenzae, and M. catarrhalis
- Bilateral AOM
 - More likely bacterial

AOM – Bacterial Microbiology

- *H. influenzae*
 - ~ 45% of cases and more often in bilateral AOM
- *S. pneumoniae* ~ 50 % of cases
- *M. catarrhalis* ~10 % of cases
- Group A strep ~ 2 to 10 %
 - Occurs more in older children with more local complications without systemic signs

AOM- Viral Microbiology

- Most frequently
 - respiratory syncytial virus
 - picornaviruses (eg, rhinovirus, enterovirus)
 - coronaviruses
 - influenza viruses
 - adenoviruses
 - human metapneumovirus

AOM- Clinical Features

- Nonspecific
 - Fever, irritability, headache, anorexia, vomiting, and diarrhea
- Fever
 - Temperature $>40^{\circ}\text{C}$ (104°F) is unusual
- Otalgia: the most common complaint and best predictor
- Most important sign is a bulging TM

AOM- Clinical Syndromes

- Otitis-conjunctivitis
 - Otitis media and purulent conjunctivitis
 - Otalgia typically begins on the same day as, or within three days of, the eye symptoms
 - Usually caused by *H. influenzae*

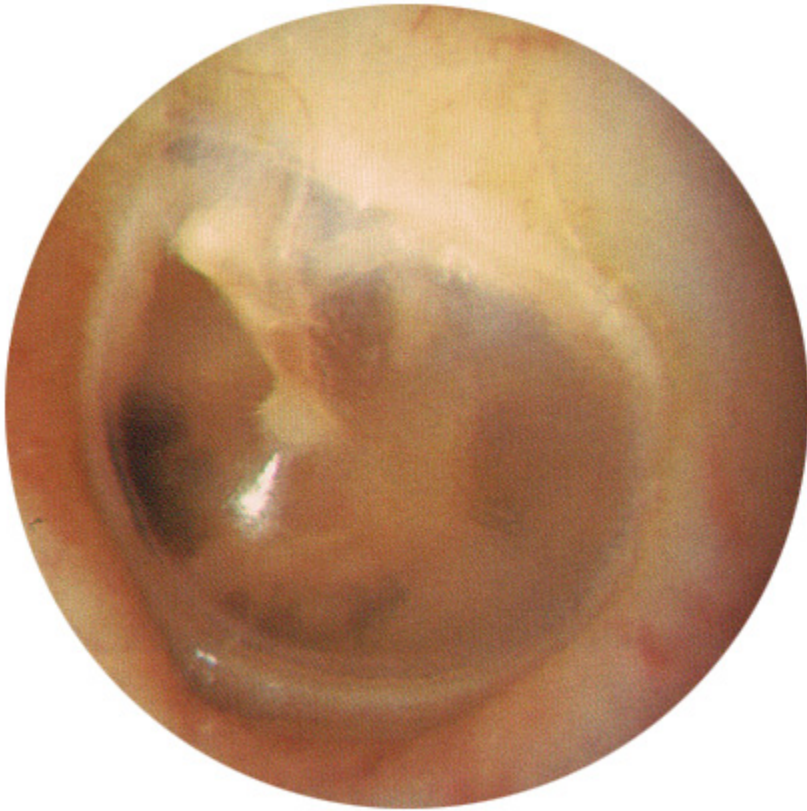
AOM- Clinical Syndromes

- Bullous myringitis
 - Bullae on the TM in conjunction with AOM
 - ~ 5 percent of cases of AOM in children < two
 - More painful than AOM
 - Think Mycoplasma

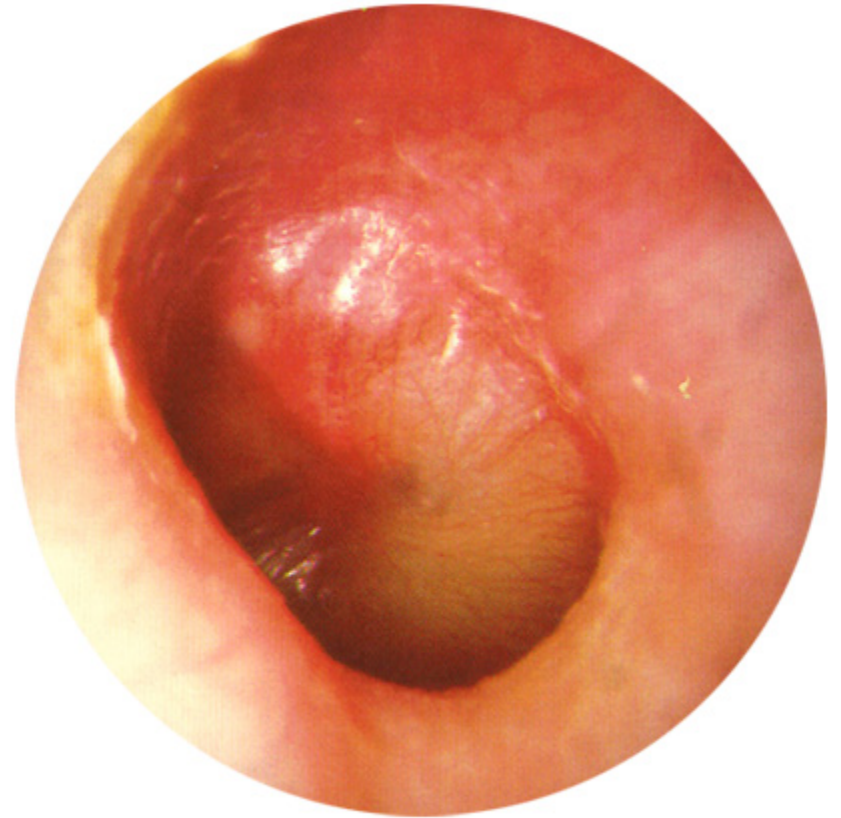


AOM - Diagnosis

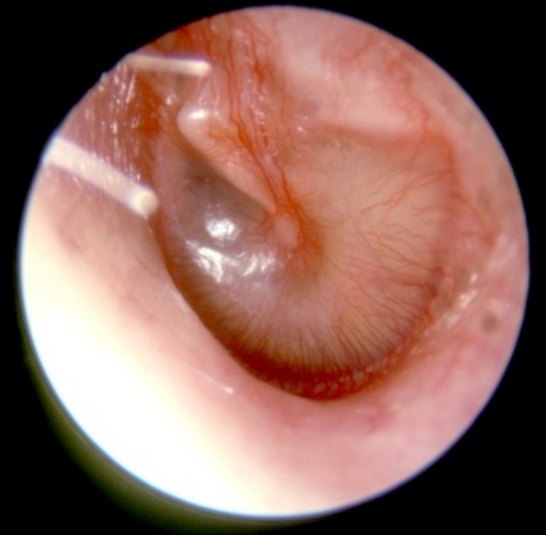
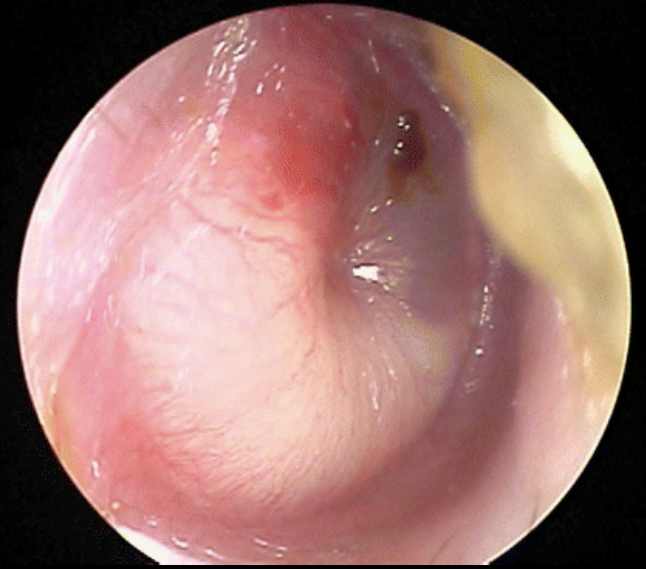
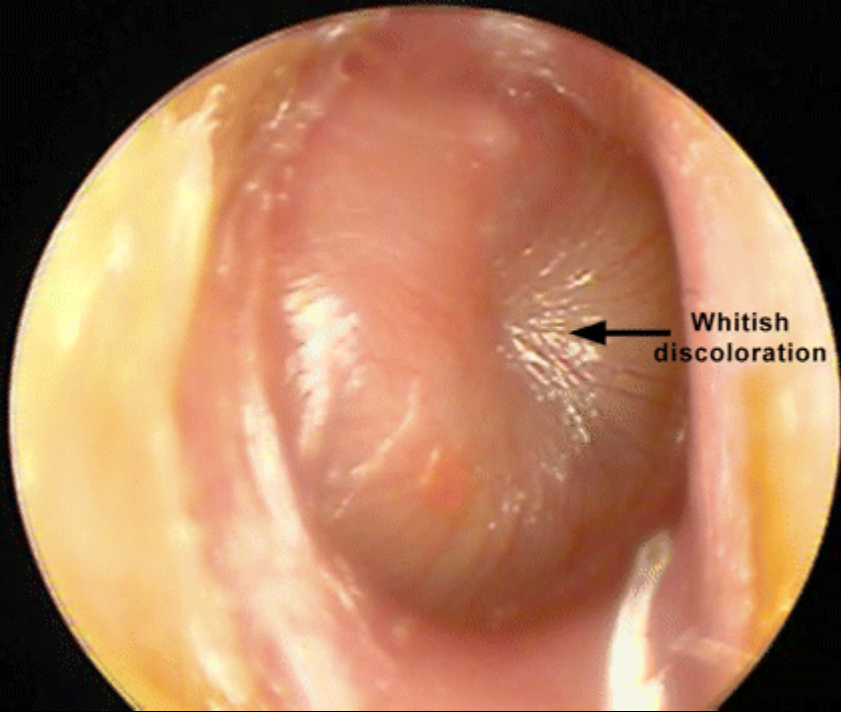
- Evidence of an acute history
 - URI
 - Fever
- Signs and symptoms of middle ear inflammation
 - Bulging TM
 - Purulent effusion



Normal Eardrum



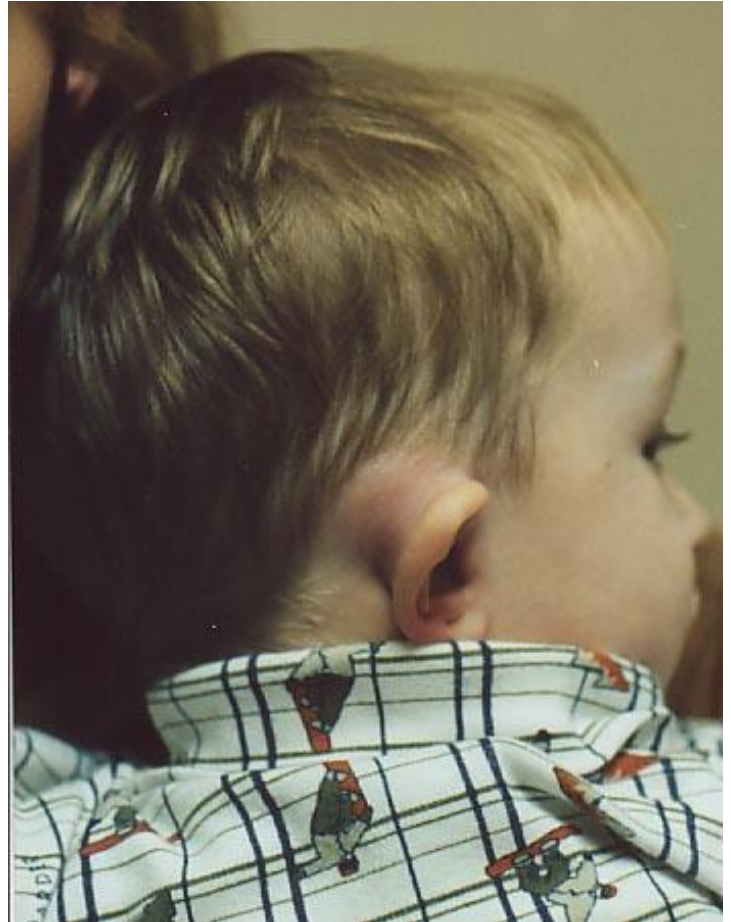
Acute Otitis Media (ear infection)



AOM - Complications

- Hearing loss
 - Median loss is 25 dB which mimics ear plugs
- Balance and motor problems
- TM perforation
 - Increased in Strep
- Chronic suppurative otitis media
- Cholesteatoma
- Mastoiditis





AOM - Treatment

- ANTIBIOTIC THERAPY VS OBSERVATION
 - AAP/AAFP 2004 guideline
 - observation without antibiotics is an option for selected children with uncomplicated AOM

AOM – Treatment Guidelines

- Children < two with AOM should be treated with antibiotics
- Children > two with bilateral disease or otorrhea also require antibiotics
- Healthy children with mild symptoms and unilateral AOM can be observed
 - Caretakers must understand the risks
 - Check in with patient within 48-72 hours

AOM - ANTIMICROBIAL THERAPY

- The AAP/AAFP guideline recommends
 - **Amoxicillin of 80 to 90 mg/kg per day**
 - Not as first-line therapy in kids at high risk for amoxicillin resistance
 - Those treated with antibiotics in the previous 30 days
 - Those with purulent conjunctivitis
 - Those on Amoxicillin chemoprophylaxis

AOM – Tx- Penicillin Allergy

- In patients with penicillin allergy without type 1 hypersensitivity reaction
 - Cefdinir (14 mg/kg per day in 1 or 2 doses; max dose 600 mg/day)
 - Cefpodoxime (10 mg/kg per day once daily; max dose 800 mg/day)
 - Cefuroxime (Suspension: 30 mg/kg per day BID, max dose 1 g/day; cefuroxime tablets: 250 mg every 12 hours)

AOM – Tx- Penicillin Allergy

- If Type 1 reactions you can use Macrolide antibiotics
 - Resistance is common
- Azithromycin
 - (10 mg/kg per day [maximum dose 500 mg/day] as a single dose on day one
 - 5 mg/kg per day [maximum dose 250 mg/day] for days two through five)
- TMP-SMX may be useful in regions where pneumococcal resistance is not a concern
 - TMP-SMX should not be used if group A streptococcus is suspected

AOM- Duration of Tx

- AAP/AAFP guideline
 - A five- to seven-day course of antibiotics is appropriate for kids six years and older who have mild to moderate disease without a history of frequent AOM
- Children < two should be treated for 10 days

AOM-Treatment Failure

- Signs of illness usually resolve in 24 to 72 hours
- The AAP/AAFP guideline
 - High-dose Augmentin (90 mg/kg per day amoxicillin and 6.4 mg/kg per day of clavulanate BID)
 - Macrolides **NOT** recommended in treatment failure
 - IM Ceftriaxone (50 mg/kg) x 1
 - Provides high concentrations in the middle ear for > 48 hours
 - If no better within 48 hours a second dose is administered and, if necessary, a third dose
- Consider referral for T tube placement

AOM Cheat Sheet

- Uncomplicated >2 years
 - Observe
- Complicated or < 2 years
 - Treat with antibiotics

AOM Cheat Sheet

- First line in uncomplicated case
 - Amoxil
 - Cephalosporin if PCN allergic (non Type 1)
 - Azithromycin if PCN allergic (Type 1) or TMP-SMX unless resistant area
- If treatment failure with first line
 - Augmentin (high dose)
 - Ceftriaxone IM
 - TMP-SMX

AOM Cheat Sheet

- Duration of treatment
 - 10 days unless >6 and uncomplicated in which case 5-7 days is sufficient

Strep Pharyngitis - Introduction

- Group A streptococcal (GAS) ~ 15 to 30 percent of all pharyngitis in kids between the ages of 5 and 15



Strep Pharyngitis – Presentation

- > 3 years
 - Abrupt onset of sore throat, tender cervical adenopathy, GI symptoms and fever
- < 3 years
 - Usually atypical : nasal congestion, discharge, low-grade fever, tender anterior cervical adenopathy , nausea and vomiting
- <1 year may have fussiness, ↓ appetite, and low-grade fever
 - Usually have school aged sibling or in daycare

Strep Pharyngitis – Clinical Features

- Palatal petechiae
- Exudates



Strep Pharyngitis - Diagnosis

- No single sign or symptom reliably identifies strep
- Clinical scores using studies have been developed in an attempt to predict the likelihood of a + throat culture

Strep Pharyngitis – Diagnosis Sample Score System

- One point for each of the following:
 - Age (5 to 15 years)
 - Season (late fall, winter, early spring)
 - Evidence of acute pharyngitis (erythema, edema, and/or exudates) on exam
 - Tender, enlarged anterior cervical lymph nodes
 - Middle-grade fever (between 101 and 103°F)
 - Absence of signs of viral URI
- With a score of six, the likelihood of a + throat culture is ~ 85%
- With a score of five, the likelihood falls to 50 %

Strep Pharyngitis –Who to test?!

- It is recommended **NOT** testing for GAS in children and adolescents with manifestations suggestive of viral illness
- Testing **IS** recommended for
 - Those with evidence of acute pharyngitis and absence of signs and symptoms of viral infection
 - Those with symptoms of GAS and exposure to an individual with GAS

Strep Pharyngitis – Which test?!

- Throat culture is the **gold standard**
 - Sensitivity of 90 to 95 percent
 - If results will not be available for > 48 hours do a rapid
- Rapid antigen detection test
 - Only for kids with a strep score of ≥ 5
 - Specificity of $\geq 95\%$
 - Sensitivity 65 - 90 %
 - A negative RADT does not rule out strep
 - ALL rapids should have a throat culture performed

Strep Pharyngitis – How To

- If doing a rapid it is advised to use two swabs at once:
 - One for RADT; if positive, second swab can be tossed
 - If negative, the second swab can be used for standard culture
- Specimens should be obtained by vigorous swabbing of both tonsils or tonsillar fossae and the posterior pharynx
 - May cause vomiting
- The swab(s) should be moved into and out of the mouth without touching the tongue or the buccal mucosa

Strep Pharyngitis – Why Test?!

- Prevent overuse use of antibiotics
- Reduce duration and severity of symptoms
- Prevent complications and acute rheumatic fever
- Prevent disease transmission

Strep Pharyngitis - Treatment

- No longer contagious after 24 hours of antibiotic therapy
- Amoxicillin is first line therapy
 - 50 mg/kg per day orally Bid or TID for 10 days
- IM benzathine Pen G (single dose) can be used if patients cannot complete oral therapy or are at increased risk for rheumatic fever
- Cephalosporins for recurrent strep
- Patients with penicillin allergy can be prescribed
 - Azithromycin 12 mg/kg orally once daily for five days

Strep Pharyngitis - Complications

- Recurrent strep
 - If six infections in one year or three to four in two consecutive years patient refer for evaluation
- Acute rheumatic fever
- PANDAS syndrome
 - Pediatric autoimmune neuropsychiatric disorder associated with group A streptococci (PANDAS)

Strep Pharyngitis- Prognosis & Follow up

- Re-testing is not necessary unless you suspect treatment failure
- Prognosis is excellent and counseling on prevention is key
 - Hand washing and not sharing utensils, cups and makeup is essential

Epistaxis - Introduction

- Very common in children
- Rarely are they severe or a cause for alarm
- However, frequent minor nosebleeds can be frustrating and scary for parents and children

Epistaxis – Clinical Features

- Can range from blood on tissue to open faucet bleeding
- Often confused for coughing up or spitting up blood
- Can be chronic

Epistaxis – Evaluation

- Is it an emergent or non- emergent episode
- Check vitals
 - BP!
- Consider referral if chronic
- Consider underlying disorders

Epistaxis - Diagnosis

- Complete ENT exam with careful attention to the anterior septum and posterior pharynx

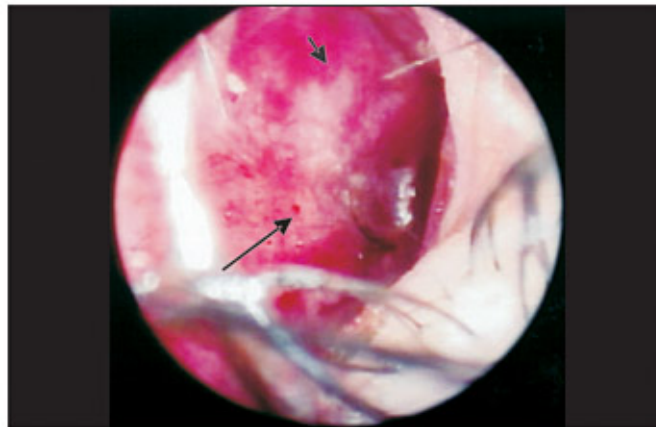
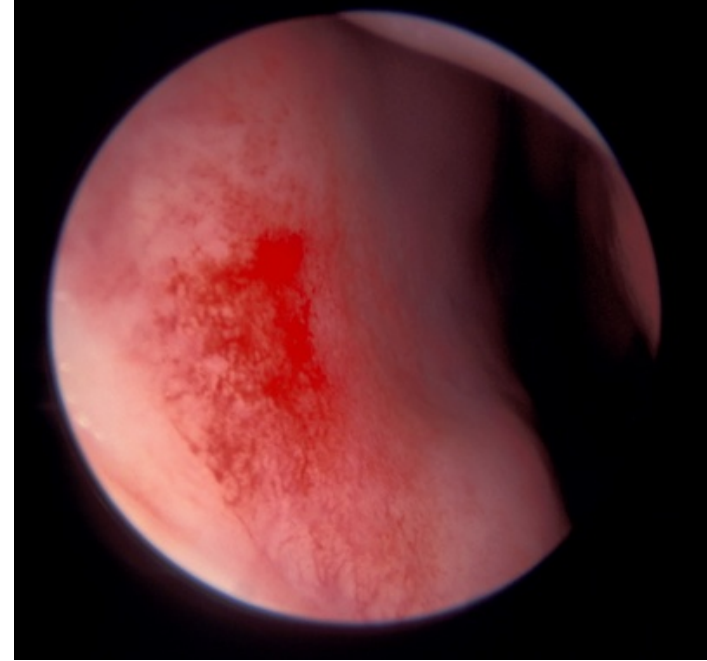
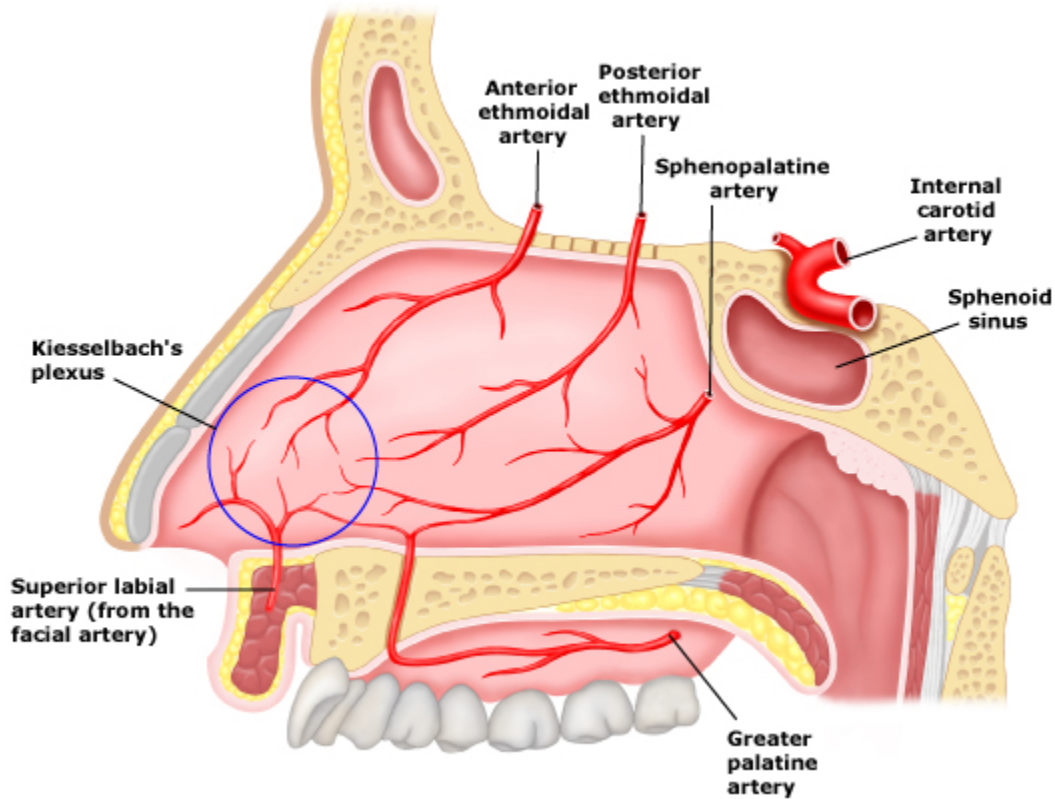


Photo 1. LL presentation with septal anterior-inferior damage, presence of vasculitis, dryness, infiltration, mucosa hyperemia, crusts and blood spots.

Kiesselbach's plexus



Epistaxis - Treatment

- Compression
 - Pressure should be applied for at least five minutes with the child sitting up, bent forward
- Cautery
 - If anterior septal bleed unresponsive to compression
 - Chemical cautery uses silver nitrate stick
 - Tip is applied to a small area surrounding the bleeding site, starting proximally
 - Risk of perforation

Epistaxis – Prognosis and Follow Up

- Excellent
- For recurrent minor bleeds
 - Discourage nose picking
 - Apply Neosporin to the anterior septum nightly for 2 weeks