Objectives

- Define acute and chronic otitis media
- Describe the different types of middle ear effusions
- Discuss when ear tubes are indicated
- Discuss how to manage ear tubes in the primary care, urgent care and emergency room settings

Disclosures

- None

Otitis Media

- Acute Otitis Media
  - Suppurative, purulent
- Otitis Media with Effusion
  - Serous, non-suppurative, mucoid

Acute Otitis Media

- In 2006, 8.8 million patients under 18 were reported to have ear infections with an estimated treatment cost of $2.8 billion dollars
- Affects 60% of children by age 1 and 80% by age 3
- Etiology
  - Often, but not always follows a viral URI
  - Dysfunction of eustachian tube
  - Most common organisms are Strep pneumonia, Haemophilus influenzae, Moraxella catarrhalis
**Acute Otitis Media**

**Definition:**
Painful inflamed or bulging eardrum with middle ear purulence and fever, often accompanied by one or more additional systemic symptoms.

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**Risk Factors**
- Age
- Gender
- Race
- Craniofacial abnormalities
- Daycare
- Allergies
- Family history of ear infections
- GERD
- Immunodeficiency
- Smoke exposure

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**Symptoms**
- Otalgia
- Fever
- Irritability
- Change in appetite
- Nausea/vomiting

**Signs**
- Cloudy TM
- Retracted TM
- Bulging TM
- Hyperemia (Injected) TM
- Reduced TM mobility

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**Differential Diagnosis of Otalgia**
- Otitis externa
- EAC trauma
- Foreign body
- Teething or other “T’s”

**Physical Exam**
- Inspect the TM
  - Normal landmarks present
  - Describe effusion
  - Intact or not?
  - Pneumatic otoscopy
  - A RED TM DOES NOT = AOM

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**Complications of Acute Otitis Media**

- **TM Rupture**
  - Otorrhea in the absence of ear tube or previously identified perforation
  - Treat with ototopical antibiotics +/- steroids, oral antibiotics?

- **Mastoiditis**
  - Suppurative progression of untreated or complicated AOM
  - May or may not cause erosion of mastoid cavity
  - Signs/Symptoms:
    - Fever
    - Malaise
    - Otalgia

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**Treatment**
- Analgesics
- Observation for 24-48 hours if close follow up available
- Oral antibiotics for 10 days
  - Amoxicil-first line; may change if no improvement in 48-72 hours
  - Augmentin
  - 2nd or 3rd generation cephalosporins: Omnicef, Suprax, Cefzil, Rocephin IM
  - Clindamycein
  - Bactrim
  - Macrolides
# Acute Mastoiditis

- **Physical Exam**
  - Purulent otorrhea if TM is ruptured
  - Bulging TM
  - Postauricular erythema, tenderness, edema
    - May displace the auricle anteriorly and inferiorly

- **Imaging**
  - CT scan is preferred: shows mastoid and middle ear opacification with/without erosion of mastoid bone cavity

- **Treatment**
  - Myringotomy +/- tube placement
  - IV antibiotics
  - Mastoidectomy

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# Otitis Media with Effusion

- **Fluid in the middle ear space without signs/symptoms of acute infection**
  - Acute
  - Chronic
    - Lasting longer than 12 weeks

- **Synonyms**
  - Ear fluid
  - Serous otitis media
  - Non-suppurative otitis media

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# Otitis Media with Effusion

- **90% of children have OME before school age**
  - On average of 4 episodes of OME each year
  - 2.2 million diagnosed episodes yearly with an average cost (US) of $4.0 billion

- **Usually asymptomatic**

- **Risk Factors**
  - URI
  - ETD
  - Inflammation post AOM
  - Down Syndrome or cleft palate at higher risk

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# Otitis Media with Effusion

- **Signs/Symptoms**
  - Usually asymptomatic
    - No fever or change in appetite
  - Decreased hearing
  - Otalgia
  - Tugging
  - Speech delay or regression
  - Poor school performance

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Otitis Media with Effusion

- **Physical Exam**
  - Presence of fluid
  - Pneumatic otoscopy
  - Tympanometry and/or audiogram

- **Complications**
  - 5 times higher risk of developing AOM
  - TM perforation
  - Hearing loss
  - Speech delay/regression

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- **Treatment**
  - Identify at-risk children
    - Increased risk for speech, language, or learning problems due to OME
  - Watchful waiting
    - For 3 months from date of onset if known or 3 months from diagnosis if not known in children not at risk
  - Steroids-intranasal and systemic not recommended
  - Antihistamines/decongestants-not recommended
  - Systemic antibiotics-not recommended but can be used if not previously treated
  - Referral for surgery-tympanostomy tubes +/- adenoidectomy

- **Children at risk**
  - Negatively impacted by OME with associated hearing loss and/or speech and language delay
  - Down Syndrome
    - Recurrent and chronic OM
    - Poor ETD
    - Stenotic ear canals
  - Cleft Palate
    - Occurs in 1 in 700 live births
    - “OME occurs in nearly all infants and children with cleft palate” – AAO-HNS
    - Midline structural abnormalities limits the ability of the eustachian tube to open actively

- **Managing children at risk**
  - Assess children for OME at 12-18 months of age
    - Critical time for development of language, speech, balance, and coordination
  - If OME is present in at-risk child, tympanostomy tubes should be offered if likelihood of spontaneous resolution is low
    - Type B tympanogram
    - Persistent fluid > 12 weeks
    - If patient doesn’t receive tubes, frequent follow up with audiogram is recommended

- **When to refer to ENT**
  - Recurrent AOM
    - 3 infections in 6 months
    - 4 infections in 12 months
  - Child has OME with associated hearing loss
  - Child is at risk and has fluid present that will likely not resolve quickly
    - Underlying permanent hearing loss
    - Down Syndrome
    - Craniofacial disorders
    - ASD
    - Speech and language delay

- **Tympanostomy Tubes**
  - Most common outpatient pediatric surgery in US
  - 667,000 procedures yearly in children under 15
  - Synonyms
    - Ventilation tubes
    - Pressure equalization tubes
  - Cost at Children’s in 2016 was $4,685.50
  - Stay in TM for 9-18 months
  - 1% risk of retention
  - 1% risk of residual perforation
Tympanostomy Tube

Tympanostomy Tubes: Vents, not Drains

Managing in the primary care setting
- AOM with patent tubes = otorrhea
  - No associated otalgia
  - Afebrile
  - No pain with palpation of tragus
- Treatment
  - Ototopical drops
    - Ofloxacin
    - CiproDex
    - Cortisporin SUSPENSION-use only if needed due to risk of ototoxicity
  - Does not require oral antibiotics
  - Water precautions
  - Follow up with ENT

References
- Goldenberg D, Goldenstein B. “Complications of Acute and Chronic Otitis Media” Handbook of Otolaryngology (2011): 129

References