

**Otitis Media:** an inflammation of the middle ear and its contents

#### Risk Factors

- Young age
- Children in day-care (viral illness exposure)
- Parenteral smoking exposure
- Pacifier use
- Bottle-feeding while lying down (elevates tongue at back → blocks Eustachian tube)
- Short duration of breast feeding (<3 mo)
- First nations or Inuit ethnicity
- Males than females
- Family history of AOM
- Orofacial abnormalities (cleft palate)

#### Factors for ↑ incidence in early childhood:

- Children are more susceptible to respiratory infections
- Nasopharyngeal lymphoid tissue in children is abundant
- Eustachian tube in children is shorter, more horizontal and smaller in diameter

#### Symptoms: non-specific symptoms

- Malaise, irritability, nausea and vomiting
- Decreased playfulness, difficulty sleeping
- Infants may pull at ears
- Older children (verbal) may report muffled hearing and ear pain (otalgia)
- Fever is present
- Acute onset

#### Signs: otoscopic infection

- Bulging, red/opaque/yellow eardrum
- Poor pneumatic movement of eardrum
- Presence of fluid in middle ear cavity (middle ear effusion) → loss of bony landmarks or presence of an air-fluid level
- Acute perforation w/ purulent discharge (otorrhea) = bacterial

#### Laboratory findings

- Leukocytosis (increased WBC)
- Tympanocentesis (middle ear culture)

#### Pathogenesis: EUSTACHIAN TUBE DYSFUNCTION

##### Normal functions of Eustachian tube

- To protect the middle ear from sound pressure and secretions
- To drain secretions into the throat
- To replenish oxygen in the middle ear space

Obstruction of the Eustachian tube results from:

- Inflammation occurring during infection or allergies
- Mechanical pressure from enlarged adenoids or tumors
- Structural abnormalities

#### Etiology

- Viruses thought to compromise the normal defenses
- Causes

- S. pneumonia
- H. influenza
- M. catarrhalis
- S. pyogenes (5-10%)
- S. aureus (<5%)

#### Empiric therapy

#### Treatment goals

- Eradicate bacteria from middle ear
- Control pain
- Prevent suppurative complications
- Prevent or minimize adverse reactions to medications

#### Watchful waiting

Children > 6 mo old with sx lasting for <48 h who are mildly ill, alert, low-grade fever (<39 C), responding to analgesics, mild otalgia (ear pain) and mild-mod bulging eardrum

- Delay antibiotic for 24-48 h
- Ensure monitoring and follow-up
- Treat pain and fever w/ ibuprofen or acetaminophen and warmed oils instilled into ear

#### Immediate antibiotic use

- Children with bulging TM who are febrile (>39) & mod-severely systemically ill
- Children w/ severe otalgia or significantly ill for 48 h
- Children with perforated TM & purulent discharge/sx
- Children 6 wk – 6 mo (< 6 wk = ER)

#### Duration of treatment

- If >2 years old: 5 days
- If <2 years old or txt failure/recurrence: 10 days

**Factors for drug resistance (S. pneumoniae):**

- Daycare attendance
- Antibiotic use within past month
- Recurrent otitis media

**Monitoring**

- Sx improvement w/in 24 h (reduced pain and fever)
- Sx resolution w/in 2-3 days
- If no improvement, switch to second-line abx
- Sterile fluid in middle ear & reduced hearing up to 6 wks is an expected consequence in 50% of affected children

**Complications (inadequate txt):**

- Meningitis
- Brain abscess
- Conductive deafness
- Facial nerve paralysis
- Acute mastoiditis
- Chronic otitis media (perforated eardrum and chronic discharge)

**Recurrent AOM:**

- 3 episodes in 6 months OR 4 episodes in 1 year
- Antibiotic prophylaxis may be considered (1-6 mo)
  - Amox 20 mg/kg/day
  - Sufisoxazole 50-75 mg/kg/d
- NTT: 9 months
- Prevention methods: avoid day cares (6+ children), avoid pacifiers, encourage breast feeding, vaccinate w/ influenza A and pneumococcal vaccines

**Treatment**

Amoxicillin	40 mg/kg/day as TID <b>First-line therapy</b>	<ul style="list-style-type: none"> <li>• Narrow spectrum (S. pneum, beta-lactamase negative H. flu, GAS)</li> <li>• Excellent middle ear penetration</li> <li>• Cheap, well tolerated</li> </ul>
Second-line therapy		
High-dose amoxicillin	80-90 mg/kg/day as TID	S. pneumonia resistance
Amoxicillin-Clavulanate (7:1 formula)	80-90 mg/kg/day as TID	In cases with purulent conjunctivitis (beta lactamase producing H. flu and/or M. Cat)
Cefuroxime (2 <sup>nd</sup> gen)	30 mg/kg/day as BID	<ul style="list-style-type: none"> <li>• In cases with purulent conjunctivitis</li> <li>• Pen allergy (not anaphylaxis or angioedema)</li> </ul>
Cefprozil (3 <sup>rd</sup> gen)	30 mg/kg/day as BID	Cefixime (3 <sup>rd</sup> gen) used in pen allergy (if no anaphylaxis or angioedema)
Azithromycin	10 mg/kg/day x 1 day, 5 mg/kg on days 2-5	<ul style="list-style-type: none"> <li>• 3 years old</li> <li>• Penicillin allergy</li> </ul>
Clarithromycin	15 mg/kg/day as BID	
Third-line		
Clindamycin	8-12 mg/kg/day as TID	<ul style="list-style-type: none"> <li>• &gt; 3 yo</li> <li>• Inferior killing</li> </ul>
Others		
Erythromycin ethylsuccinate + sulfisoxazole		40 mg/kg/day as TID
Trimethoprim/ Sulfamethoxazole		6 mg/kg/day as BID
Ceftriaxone	50 mg/kg IM/day x 3 days	<ul style="list-style-type: none"> <li>• Severe cases</li> <li>• 10% higher chance of anaphylaxis</li> <li>• Painful</li> </ul>

**Otitis Media with Effusion (OME):** presence of fluid in middle ear without signs or symptoms of acute ear infection

- Sx: hearing loss, crackle sound, no pain/fever, no suppurative complications
- Management: watchful waiting, limit passive smoke exposure, treat associated sinusitis, control food (milk) & inhalant allergies, auto-inflation of Eustachian tube (Valsalva maneuver) in older children

**OME persisting > 3 months**

- Hearing evaluation as language development may be impaired
- Abx boost short-term resolution by 15% (use 2<sup>nd</sup> line)
  - repetitive, prolonged or prophylactic abx avoided
- Last resort – oral prednisone or prednisolone **plus** second-line antibiotic (hearing impaired children >3) prior to surgical procedures