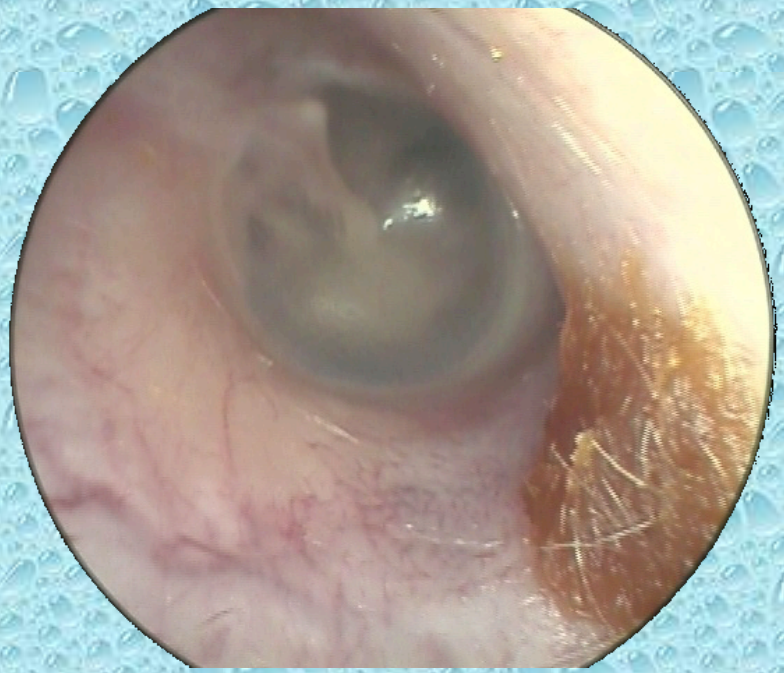
Update on the Diagnosis and Management of Otitis Media

Leslie Herrmann MD, FAAP

Pediatrician

Disclosures

- I have no financial disclosures.



Objectives

- Understand the new diagnostic criteria for OM
- Know when to treat vs when to watch and wait
- Know appropriate antibiotics to use in different clinical scenarios

Main Source

- Pediatrics. 2013 Mar;131(3):e964-99. doi: 10.1542/peds. 2012-3488. Epub 2013 Feb 25. **The diagnosis and management of acute otitis media.** Lieberthal AS, Carroll AE, Chonmaitree T, Ganiats TG, Hoberman A, Jackson MA, Joffe MD, Miller DT, Rosenfeld RM, Sevilla XD, Schwartz RH, Thomas PA, Tunkel DE. American Academy of Pediatrics and American Academy of Family Physicians
- **Clinical Practice Guideline**
- **Last revised in 2004**
- **Committee: pediatrics, family medicine, ENT, epidemiology, ID, EM, and guideline methology**

Changes Since the 2004 Guidelines

- Stricter diagnostic criteria
- Emphasis on watch and wait when appropriate
- Slightly different antibiotics recommended

Target Population

- Ages 6 months to 12 years
  - 6-23 months
  - 2-12 years
- We extrapolate the recommendations in our population.

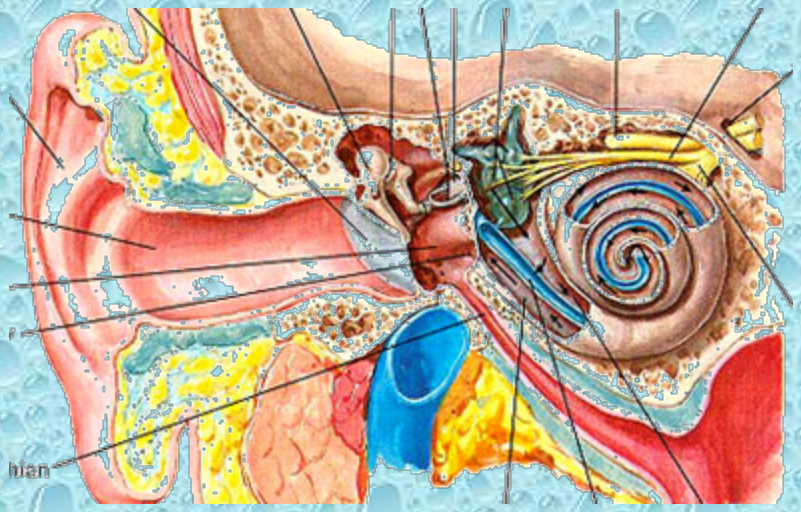
How is our population different?

- Higher rates of otitis media, perforations, and myringotomy tube placement

- Theories:
  - Poverty, less educated parents, crowded housing, tobacco smoke, heating smoke
  - Pneumococcal vaccine-resistant serotypes are more common
  - Anatomical differences in the bony segment of the eustachian tube

Pathogenesis

1. Nasopharyngeal infection with an otopathogen.
2. Inflammation and edema → obstruction of the eustachian tube.
3. Negative pressure → accumulation of secretions.



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Most Common Pathogens

- *Streptococcus pneumoniae* (~50%)
- Non-typeable *Haemophilus influenzae* (~45%)
- *Moraxella catarrhalis* (~10%)
- Other: GAS, *Staph*, anaerobes (*Pseudomonas*)
- Viruses: RSV, rhinovirus, enterovirus, coronaviruses, flu, adenovirus, HMPV

Complications

- Hearing loss
- Balance problems
- Cholesteatoma
- Mastoiditis
- Intracranial complications
  - Infection: meningitis, epidural/brain abscess
  - Thrombosis: sinus, carotid artery

Definitions

- AOM: rapid onset of inner ear inflammation
- Uncomplicated AOM: no otorrhea
- Severe AOM: moderate-to-severe otalgia OR fever ≥ 39°C (102.2°F)
- Nonsevere AOM: mild otalgia and temperature < 39°C (102.2°F)
- OME: OM with effusion, also called serous OM – fluid in the middle ear without signs of infection

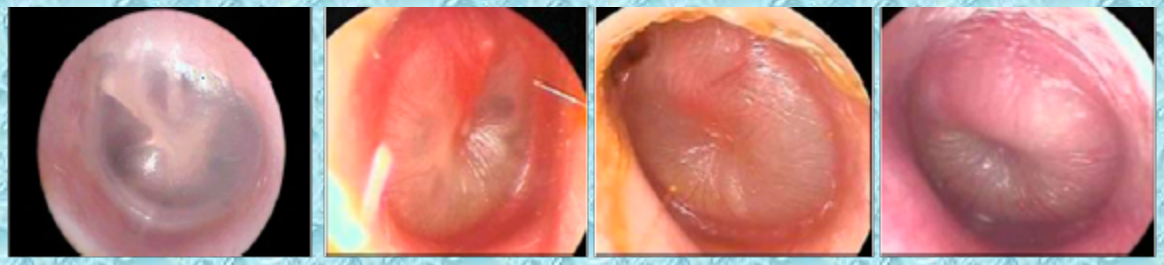
Diagnostic Signs

TABLE 2 Otoscopic Findings in Children With Acute Symptoms and MEE*

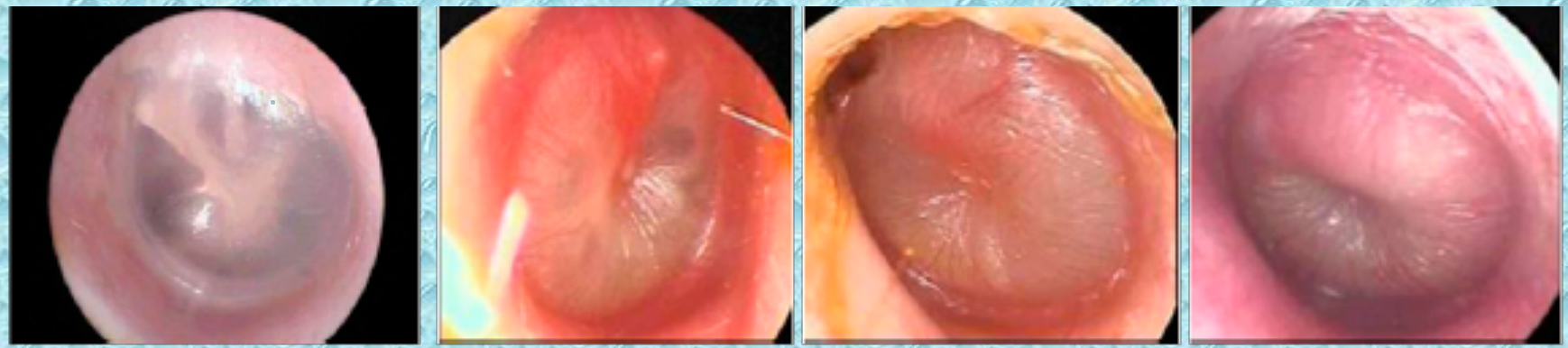
TM Finding in Acute Visits With MEE	Group I (Tampere, Finland), %	Group II (Oulo, Finland), %
Color		
Distinctly red	69.8	65.6
Hemorrhagic	81.3	62.9
Strongly red	87.7	68.1
Moderately red	59.8	66.0
Slightly red	39.4	16.7
Cloudy	95.7	80.0
Normal	1.7	4.9
Position		
Bulging	96.0	89
Retracted	46.8	48.6
Normal	32.1	22.2
Mobility		
Distinctly impaired	94.0	78.5
Slightly impaired	59.7	32.8
Normal	2.7	4.8

* Totals are greater than 100%, because each ear may have had different findings.[43]

Diagnosis



Diagnosis



Normal!

mild bulging
+
recent onset
of ear pain

moderate-to-
severe bulging

Dx AOM

Who to treat?

- All children with severe AOM – unilateral or bilateral
  - moderate-to-severe otalgia
  - fever ≥ 39°C (102.2°F)
- Children younger than 24 months with BILATERAL nonsevere AOM
  - mild otalgia
  - temperature < 39°C (102.2°F)

Watch and Wait

- Children younger than 24 months with UNILATERAL nonsevere AOM
  - mild otalgia
  - temperature < 39°C (102.2°F)
- Children older than 2 years with nonsevere AOM – unilateral or bilateral
  - mild otalgia
  - temperature < 39°C (102.2°F)

Treat vs Watch and Wait

TABLE 4 Recommendations for Initial Management for Uncomplicated AOM[a]

Age	Otorrhea With AOM[a]	Unilateral or Bilateral AOM[a] With Severe Symptoms[b]	Bilateral AOM[a] Without Otorrhea	Unilateral AOM[a] Without Otorrhea
6 mo to 2 y	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy or additional observation
≥2 y	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy or additional observation	Antibiotic therapy or additional observation[c]

[a] Applies only to children with well-documented AOM with high certainty of diagnosis (see Diagnosis section).

[b] A toxic-appearing child, persistent otalgia more than 48 h, temperature ≥39°C (102.2°F) in the past 48 h, or if there is uncertain access to follow-up after the visit.

[c] This plan of initial management provides an opportunity for shared decision-making with the child's family for those categories appropriate for additional observation. If observation is offered, a mechanism must be in place to ensure follow-up and begin antibiotics if the child worsens or fails to improve within 48 to 72 h of AOM onset.

Watch and Wait

- MUST have mechanism in place to provide treatment in 48-72 hours if needed.
- WILL NOT increase complications if there is appropriate follow-up.
- Reduces multidrug resistant organisms.

- NOTE: continue to provide pain control in this group.

Treatment

TABLE 5 Recommended Antibiotics for (Initial or Delayed) Treatment and for Patients Who Have Failed Initial Antibiotic Treatment

Initial Immediate or Delayed Antibiotic Treatment		Antibiotic Treatment After 48–72 h of Failure of Initial Antibiotic Treatment	
Recommended First-line Treatment	Alternative Treatment (if Penicillin Allergy)	Recommended First-line Treatment	Alternative Treatment
Amoxicillin (80–90 mg/ kg per day in 2 divided doses)	Cefdinir (14 mg/kg per day in 1 or 2 doses)	Amoxicillin-clavulanate[a] (90 mg/kg per day of amoxicillin, with 6.4 mg/kg per day of clavulanate in 2 divided doses)	Ceftriaxone, 3 d Clindamycin (30–40 mg/kg per day in 3 divided doses), with or without third-generation cephalosporin
or	Cefuroxime (30 mg/kg per day in 2 divided doses)	or	Failure of second antibiotic
Amoxicillin-clavulanate[a] (90 mg/kg per day of amoxicillin, with 6.4 mg/kg per day of clavulanate [amoxicillin to clavulanate ratio, 14:1] in 2 divided doses)	Cefpodoxime (10 mg/kg per day in 2 divided doses)	Ceftriaxone (50 mg IM or IV for 3 d)	Clindamycin (30–40 mg/kg per day in 3 divided doses) plus third-generation cephalosporin
	Ceftriaxone (50 mg IM or IV per day for 1 or 3 d)		Tympanocentesis[b] Consult specialist[b]

IM, intramuscular; IV, intravenous.

[a] May be considered in patients who have received amoxicillin in the previous 30 d or who have the otitis-conjunctivitis syndrome.

[b] Perform tympanocentesis/drainage if skilled in the procedure, or seek a consultation from an otolaryngologist for tympanocentesis/drainage. If the tympanocentesis reveals multidrug-resistant bacteria, seek an infectious disease specialist consultation.

[c] Cefdinir, cefuroxime, cefpodoxime, and ceftriaxone are highly unlikely to be associated with cross-reactivity with penicillin allergy on the basis of their distinct chemical structures. See text for more information.

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S pneumo

- Mechanism of resistance:
  - penicillin-binding protein
  - can be overwhelmed by saturating it with antibiotic
  - high-dose amoxicillin
- Drugs:
  - high-dose amoxicillin: 84-92% efficacy *in vitro*
  - cephalosporins: 70-80% efficacy *in vitro*

Nontypeable *H flu*

- Mechanism of resistance:
  - beta-lactamase
  - use beta-lactamase inhibitor
  - amoxicillin-clavulanate
- Drugs:
  - amoxicillin: 58% efficacy *in vitro*
  - amoxicillin-clavulanate: 100% efficacy *in vitro*
  - cephalosporins: 98% efficacy *in vitro*

M catarrhalis

- Mechanism of resistance:
  - beta-lactamase
  - use beta-lactamase inhibitor
  - amoxicillin-clavulanate
- Very high rate of spontaneous clinical resolution
- Very rarely causes complications

Treatment

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[c] Cefdinir, cefuroxime, cefpodoxime, and ceftriaxone are highly unlikely to be associated with cross-reactivity with penicillin allergy on the basis of their distinct chemical structures. See text for more information.

Treatment

- 1st-line: high-dose amoxicillin
- 2nd-line: high-dose amoxicillin-clavulanate
- 3rd-line: 3rd-generation cephalosporin ± clindamycin

Treatment: First Episode of OM

1. high-dose amoxicillin (90 mg/kg/day ÷ twice daily)
2. Symptoms resolve.
3. Two weeks later, symptoms return.
4. What to use?
5. amoxicillin-clavulanate (90 mg/kg/day of amox component ÷ twice daily)

Treatment: Second Episode of OM

1. OM diagnosed.
2. 10 day course of amoxicillin prescribed.
3. Symptoms resolved.
4. 35 days after initial antibiotic course started, symptoms return
5. What to use?
6. amoxicillin-clavulanate (90 mg/kg/day of amox component ÷ twice daily)

Treatment: First Episode of OM

1. high-dose amoxicillin (90 mg/kg/day ÷ twice daily)
2. No improvement 48-72 hours later.
3. amoxicillin-clavulanate (90 mg/kg/day ÷ twice daily)
4. No improvement 48-72 hours later.
5. clindamycin + 3rd-generation cephalosporin
6. Refer to ENT.

Special Situations

- Otitis-conjunctivitis syndrome: commonly caused by nontypeable *Haemophilus influenzae* → may start with amoxicillin-clavulanate.

And last…

Two Hot-Button Issues

Macrolides

WARNING & DISCLAIMER: LESLIE HATES Z-PAKS.

- FDA-approved for the treatment of OM
- NOT recommended by the AAP or the AAFP for treatment of OM
  - *S pneumo*: 25-35% resistance
  - *H flu*: minimal efficacy

Penicillin Allergies

NEVER TRUE ALLERGIES!!

- Highly over-reported.
- The literature consistently shows that only 10-20% of patients who report a penicillin allergy have positive skin testing…which does not equal anaphylaxis.
- Challenge the allergy!

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