Otitis Media
When an ear infection’s not just an ear infection…

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Disclosure

• Marisa Earley, MD has no relationships with commercial companies to disclose

Learning Objectives

• At the end of this presentation the learning will be able to:
  • Discuss etiology and management of otitis media
  • Refer to and utilize relevant guidelines
  • Recognize complications of suppurative or acute otitis media

Outline

• Background
• Guidelines and Treatment
• Complications
  • Extracranial (Intratemporal)
  • Intracranial
• Take Away Points

So why should you care?

• By 3 years of age, what percent of children have had acute otitis media?
• By 7 years of age, 40% of children will have had how many AOM episodes?
• Children less than 5 years old comprise what percent of cases of AOM?
• What percent of primary care office encounters are for otitis media?
• Otitis media with effusion is the most common cause of hearing impairment in developed nations
• Minority of clinicians follow clinical practice guidelines related to OME
• Direct costs: $3 billion to $5 billion annually
  • Indirect hard to measure, especially lost caregiver productivity
Nomenclature

- Otitis Media
  - With Effusion (OME)
    - Signifies presence of fluid but not an infection
  - Acute
    - Suppurative
    - Recurrent (RAOM)
  - Chronic
    - Chronic Otitis Media with Effusion (COME)
      - Fluid persisting >3 months
    - Chronic Suppurative Otitis Media (CSOM)
      - Associated with recurrent otitis media and perforation

Accurate diagnosis of AOM

- Recent and abrupt onset
- Fluid within middle ear
- Symptoms of acute infection
  - Fever
  - Otitis
  - URI symptoms
- Often preceded by URI symptoms

Risk Factors

- Daycare and/or siblings
- URI/seasonality
- Tobacco smoke
- Pacifier use
- Did not receive pneumococcal conjugate vaccine
- 1st episode at <6 months
- Allergies
- Immune deficiency
- Cystic fibrosis
- Adenoid hypertrophy
- Syndromic and/or cleft palate
- Socioeconomic status
- Air pollution
- Low birth weight
- Obesity

Eustachian Tube Dysfunction

- “Too short, too floppy and it just don’t work right”
- Closer to horizontal
- Inflammation
  - URI, allergy, etc
- Obstruction
  - Large adenoids
- Decreased mucociliary clearance
  - Allergy, CF, 2nd hand smoke
- Too open
  - Reflux
- Abnormal pressure

Causes

- Environmental Factors
- Anatomical/Physiological
- Acute/Chronic
- Infections
- Viruses
- Bacteria
- Anomalies
- Gender
- Race
- Age
- Prematurity
- Pacifier
- Obesity

Risk Factors for Developmental Difficulties (“At Risk” kids)

- Hearing loss independent of OME
- Speech delay
- Autism spectrum disorder
- Syndromes that include cognitive, speech or language delays
- Blindness or uncorrectable visual impairment
- Cleft palate
- Developmental delay

https://societyformiddleeardisease.org/community-resources/otitis-media/
Bacteriology


Guidelines and Treatment

Table 3. Summary of Guideline Key Action Statements.

Published in: Richard M. Rosenfeld; Jennifer J. Shin; Seth R. Schwartz; Robyn Coggins; Lisa Gagnon; Jesse M. Hackell; David Hoelting; Lisa L. Hunter; Ann W. Kummer; Spencer C. Payne; Dennis S. Poe; Maria Veling; Peter M. Vila; Sandra A. Walsh; Maureen D. Corrigan; Otolaryngol Head Neck Surg 154, 201-214. DOI: 10.1177/0194599815624407

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Table 4. Practical Tips for Performing Pneumatic Otoscopy.

Published in: Richard M. Rosenfeld; Jennifer J. Shin; Seth R. Schwartz; Robyn Coggins; Lisa Gagnon; Jesse M. Hackell; David Hoelting; Lisa L. Hunter; Ann W. Kummer; Spencer C. Payne; Dennis S. Poe; Maria Veling; Peter M. Vila; Sandra A. Walsh; Maureen D. Corrigan; Otolaryngol Head Neck Surg 154, 201-214. DOI: 10.1177/0194599815624407

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Who should get antibiotics?

- Severe bilateral or unilateral AOM in all infants and children with severe signs and symptoms, such as moderate to severe ear pain and high fever.
- Bilateral AOM in infants younger than 24 months of age, without severe signs and symptoms.
- Non-severe unilateral AOM is diagnosed in young children either antibiotic therapy is given, or observation with close follow-up based on shared decision making between parent(s) and caregiver in infants 6 to 23 months of age, and if the child worsens or fails to improve within 2 to 3 days antibiotics should be administered.
- Non-severe disease in children 24 months or older can have either antibiotics or observation.

Oral Antibiotics

- Shorten period of MEE after AOM
- Reduces symptoms more quickly than placebo
- Weigh benefits against risks (vomiting, diarrhea, rash, resistance)
- Amoxicillin more effective than macrolides and cephalosporins
- 10 day treatment, higher dose (90mg/kg/day amox)

Tympanostomy Tubes

- aka Pressure Equalizing Tubes
- Remain in place 6-18 months
- AOM
  - ≥3 episodes in 6 months, or
  - ≥4 in 1 year*
- COME
  - Effusion that persists for 3 months or longer
  - May perform sooner for “at risk” children
- Treat AOM with otic drops, not antibiotics

Table 5. Treatment Guidelines

<table>
<thead>
<tr>
<th>Age</th>
<th>Center Diagnoses</th>
<th>Uncenter Diagnoses</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤6 months</td>
<td>Antibiotics</td>
<td>Antibiotics</td>
</tr>
<tr>
<td>6 months to 2 years</td>
<td>Antibiotics</td>
<td>Severe otitis media or severe otorrhea within 2 weeks of initial diagnosis</td>
</tr>
<tr>
<td>2 years and above</td>
<td>Antibiotics</td>
<td>Watchful waiting (10-12 degrees Farenheit)</td>
</tr>
</tbody>
</table>

Table 6. Summary of guideline action statements.

<table>
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<th>AOM</th>
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<td>Treat AOM with otic drops, not antibiotics</td>
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</tbody>
</table>
Figure 9. Algorithm of guideline's key action statements for children with otitis media with effusion.

Published in: Richard M. Rosenfeld; Seth R. Schwartz; Melissa A. Pynnonen; David E. Tunkel; Heather M. Hussey; Jeffrey S. Fichera; Alison M. Grimes; Jesse M. Hackell; Melody F. Harrison; Helen Haskell; David S. Haynes; Tae W. Kim; Denis C. Lafreniere; Katie LeBlanc; Wendy L. Mackey; James L. Netterville; Mary E. Pipan; Nikhila P. Raol; Kenneth G. Schellhase; Otolaryngol Head Neck Surg 149, S1-S35. DOI: 10.1177/0194599813487302

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Case:

• 14 year old girl presented to urgent care with fever and ear pain x 5 days
  • Started on Amoxicillin 40mg/kg/day
  • 2 days later had unilateral facial weakness
  • Stopped Amoxicillin, started Acyclovir and steroids
  • Told she had Bell's Palsy
  • 3 days later had increasing fever, neck stiffness and photophobia and worsening facial weakness
  • Admitted to UHS
  • +LP and blood cultures
  • Was started on IV antibiotics and had urgent bilateral myringotomy and tube placement

Complications

Intratemporal (Extracranial)

• Hearing loss
• Vestibular dysfunction
• CSOM/perforation/Cholesteatoma
• Mastoiditis or petrositis
• Labyrinthitis
• Facial nerve weakness
• Otitis externa
• Cholesterol granuloma
• Tympanosclerosis
• Ossicular discontinuity or fixation

Intracranial

• Meningitis
• Extradural abscess
• Subdural empyema
• Otitis encephalitis
• Brain abscess
• Dural sinus thrombosis
• Otitis Hydrocephalus
• Cranial nerve VI palsy

Suppurative Complications of AOM

• Decreasing numbers in post-antibiotic era
  • This leads to complacency in clinicians
  • Decreasing morbidity, mortality and need for mastoidectomy
• Factors contributing to need for mastoidectomy:
  • Coalescent disease, multiple suppurative complications, and failure to improve with IV antibiotics
Who gets complications?

- Hispanic > White > Black
- Lower socioeconomic status
- Self-pay > Private > Medicaid
- Boys
- Immune compromised patient

When to be suspicious

- High, relapsing fevers
- Meningitic findings
- Severe balance disruption
- Cranial neuropathies
- Post-auricular swelling and redness
- Abnormal fundoscopic exam
- Worsening headache
- Vision changes

Facial Nerve Paralysis

- This is not Bell's Palsy
- Secondary to intrafallopian inflammation
- Preexisting bony dehiscences
- Physiologic canaliculi between the middle ear and fallopian canal
- Vascular connections between the fallopian canal and the mastoid air cells
- Rare to need FN decompression
- Good prognosis when treated early

Meningitis

- Most common intracranial complication of AOM
- Leads to permanent SNHL and cochlear ossification
- Classic symptoms:
  - Headache, fever, vomiting, photophobia, irritability, and restlessness, seizures, neck stiffness
- Treatment:
  - Direct at H. influenzae type B with second- or third-generation cephalosporins
  - Rapid bacteriolysis releases large amounts of inflammatory fragments => severe neurologic and auditory sequelae (glucocorticoids can reduce risk of sequelae)

Opacification of middle ear and mastoid air cells on imaging is not the same thing as clinical acute mastoiditis.

Complications can happen quickly.

- Bell’s Palsy is not the appropriate diagnosis if a patient has otitis media (AOM or OME)
- If treating with Amoxicillin or Augmentin, utilize 90mg/kg/day for Amox component
- Dry ear precautions are only need for natural bodies of water, non-chlorinated pools and if children complain of pain in water
- Do not treat tube otorrhea with oral antibiotics
- Do not use Debrox or pain drops with ear tubes or perforations
- Though common, ear infections CAN be a very big deal.

THANK YOU!!

References

Thank you!

Questions?