Acute Otitis Media

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DEFINITIONS:

ACUTE OTITIS MEDIA

the presence of fluid in the middle ear with the acute onset of signs and symptoms of middle ear inflammation.

Microbiology/Virology

- *S. pneumoniae* - 30-35%
- *H. influenzae* - 20-25%
- *M. catarrhalis* - 10-15%
- Group A strep - 2-4%
- Others

Infants with higher incidence of gram negative bacilli
RSV - 74% of middle ear isolates
Rhinovirus
Parainfluenza virus
Influenza virus

Routes of Infection

1. Via eustachian tube. It is the most common route. Infection travels via the lumen of the tube or along subepithelial peritubal lymphatics. Eustachian tube in infants and young children is shorter, wider and more horizontal and thus may account for higher incidence of infections in this age group. Breast or bottle feeding in a young infant in horizontal position may force fluids through the tube into the middle ear and hence the need to keep the infant propped up with head a little higher.

Swimming and diving can also force water through the tube into the middle ear.

2. Via external ear. Traumatic perforations of tympanic membrane due to any cause open a route to middle ear infection.

3. Blood-borne. This is an uncommon route.

Stages of ASOM

- Stage of tubal occlusion
- Stage of presuppuration
- Stage of suppuration
- Stage of resolution/ complication

➢Stage of tubal occlusion

Negative intratympanic pressure

A small effusion (sub-clinical)

deafness/ earache

- Stage of presuppuration

if occlusion prolonged
inflammatory exudate / suppuration
high grade fever/restless
cart wheel appearance

Cart wheel appearance

Stage of suppuration
pus formation
point of rupture: nipple like pron
TM bulges
fever / convulsion
mastoid tenderness

- Stage of resolution/ complication

Resolve by / without medication

Partial resolution

Complete resolution

ACUTE NECROTISING OTITIS MEDIA

- It is a variety of acute suppurative otitis media, often seen in children suffering from measles, scarlet fever or influenza.

- Causative organism is Beta-haemolytic streptococcus.

- There is rapid destruction of whole of tympanic membrane with its annulus, mucosa of promontory, ossicular chain and even mastoid air cells. There is profuse otorrhoea.

- In these cases, healing is followed by fibrosis or ingrowth of squamous epithelium from the meatus *(secondary acquired cholesteatoma).*

ACUTE NECROTISING OTITIS MEDIA

- Treatment is early institution of antibacterial therapy. It is continued for at least 7-10 days, even if response is seen early.
- Cortical mastoidectomy may be indicated if medical treatment fails to control or the condition gets complicated by acute mastoiditis.

OTITIS MEDIA WITH EFFUSION (OME)

- the presence of fluid in the middle ear without acute signs or symptoms

OTITIS MEDIA WITH EFFUSION (OME)

ETIOLOGY

- Eustachian tube dysfunction
- Post-AOM

NATURAL HISTORY

- Most episodes resolve spontaneously within 3 months
- 30%-40% Recurrent OME
- 5%-10% Persistent OME > 1 year

DIAGNOSIS

- Clinicians should use pneumatic otoscopy as the primary diagnostic method for OME. OME should be distinguished from AOM.
- *Strong recommendation*
  - Pneumatic otoscopy is gold standard
    - Color
    - Position
    - Mobility
    - Tympanic membrane appearance
  - Sensitivity of 94% and specificity of 80% versus myringotomy
  - Readily available, cost effective and accurate in experienced hands

DIAGNOSIS

- Tympanometry can be used to confirm diagnosis.
  - When diagnosis is uncertain, consider tympanometry
    - Cost associated with equipment
    - Painless
    - Reliable for ages 4 months or older

SCREENING

- Population-based screening programs for OME are not recommended in healthy, asymptomatic children.
- Highly prevalent in young children. 15%-40% point prevalence in healthy children under 5 yr
  - No influence on short-term language outcomes
  - No benefit from treatment that exceeds the favorable natural history of the disease
  - Risk of inaccurate diagnoses, overtreatment, parental anxiety, and increased cost

DOCUMENTATION

- Clinicians should document the laterality, duration of effusion, and presence and severity of associated symptoms at each assessment of the child with OME.
  Recommendation
  - Medical decision making depends on these features
  - 40%-50% of OME cases no symptoms
  - Preponderance of benefit over harm

AT RISK CHILD

- Clinicians should distinguish the child with OME who is at risk for speech, language, or learning problems from other children with OME, and should more promptly evaluate hearing, speech, language, and need for intervention.
  - Permanent hearing loss
  - Speech and language delay or disorder
  - Autism-spectrum disorder/PDD
  - Syndromes with cognitive, speech, and language delays
  - Blindness
  - Cleft Palate
  - Developmental delay

WATCHFUL WAITING

- Clinicians should manage the child with OME who is not at risk with watchful waiting for 3 months from the date effusion onset (if known) or from the date of diagnosis (if onset is unknown).
  - OME is usually self-limited
  - 75%-90% of OME after AOM resolves spontaneously by 3 months
  - Waiting results in little harm to child
  - Optimize listening and learning environment until effusion resolves

MEDICATION

- Antihistamines and decongestants are ineffective for OME and are not recommended for treatment.
- Antimicrobials and corticosteroids do no have long-term efficacy and are not recommended for routine management.
  - Short-term, small magnitude benefits
  - Significant adverse effects

HEARING AND LANGUAGE

- Hearing testing is recommended when OME persists for 3 months or longer, or at any time that language delay, learning problems, or a significant hearing loss is suspected in a child with OME. Language testing should be conducted for children with hearing loss.

HEARING AND LANGUAGE

- HL may impair early language acquisition
- Extended periods of CHL may result in developmental and academic sequelae
- Early language delays are associated with later delays in reading and writing.

SURVEILLANCE

- Children with persistent OME who are not at risk should be reexamined at 3- to 6-month intervals until the effusion is no longer present, significant hearing loss is identified, or structural abnormalities of the TM or middle ear are suspected.
  - Resolution rates decrease the longer the effusion has been present
  - Risk factors for non-resolution:
    - Summer or fall onset
    - HL>30dB
    - H/O prior tympanostomy tubes
    - Not having had an adenoidectomy

SURGERY

- When a child becomes a surgical candidate, tympanostomy tube insertion is the preferred initial procedure; adenoidectomy should not be performed unless a distinct indication exists (nasal obstruction, chronic adenoiditis). Repeat surgery consists of adenoidectomy plus myringotomy, with or without tube insertion. Tonsillectomy alone or myringotomy alone should not be used to treat OME.

SURGERY

- OME > 4 months with persistent hearing loss
- Recurrent or persistent OME in at risk child
- OME with structural damage to TM or ME

Consequences

- Inappropriate antibiotic treatment of OM
  - Multidrug-resistant strains
  - Drug side effects
  - Parental/caregiver confusion

Recurrent Acute Otitis Media

- Infants and children between the age of 6 months and 6 years may get recurrent episodes of acute otitis media.

- Such episodes may occur 4-5 times in a year. Usually, they occur after acute upper respiratory infection, the child being free of symptoms between the episodes.

Recurrent Acute Otitis Media

- Recurrent middle ear infections may sometimes be superimposed upon an existing middle ear effusion. Sometimes, the underlying cause is recurrent sinusitis, velopharyngeal insufficiency, hypertrophy of adenoids, infected tonsils, allergy and immune deficiency.
- Feeding the babies in supine position without propping up the head may also use the milk to enter the middle ear directly that can lead to middle ear infection.

Management of Recurrent Acute Otitis Media

- Finding the cause and eliminating it, if possible.
- Antimicrobial prophylaxis for those having recurrent otitis media associated with upper respiratory infections. In such cases, low dose, long term antibiotic or sulphonamide can be instituted.
- Myringotomy and insertion of a ventilating tube in cases where acute episodes supervene on chronic middle ear effusion.
- Adenoidectomy with or without tonsillectomy.
- Management of inhalant or food allergy

AERO-OTITIS MEDIA (OTITIC BAROTRAUMA)

- It is a non-suppurative condition resulting from failure of eustachian tube to maintain middle ear pressure at ambient atmospheric level.
- The usual cause is rapid descent during air flight, underwater diving or compression in pressure chamber.

Mechanism

- Eustachian tube allows easy and passive egress of air from middle ear to the pharynx if middle ear pressure is high.
- In the reverse situation, where nasopharyngeal air pressure is high, air cannot enter the middle ear unless tube is actively opened by the contraction of muscles as in swallowing, yawning or Valsalva maneuver.

- When atmospheric pressure is higher than that of middle car by critical level of 90 mm of Hg, eustachian tube gets "locked", i.e. soft tissues of pharyngeal end of the tube are forced into its lumen.
- In the presence of eustachian tube oedema, even smaller pressure differentials cause "locking“ of the tube. Sudden negative pressure in the middle ear causes retraction of tympanic membrane, hyperaemia and engorgement of vessels, transudation and haemorrhages.
- Sometimes, rupture of labyrinthine membranes with vertigo and sensorineural hearing loss.

Clinical Features

- Severe earache, deafness and tinnitus are common complaints.
- Vertigo is uncommon.
- Tympanic membrane appears retracted and congested. It may get ruptured.
- Middle ear may show air bubbles or haemorrhagic effusion.
- Hearing loss is usually conductive but sensorineural type of loss may also be seen.

Treatment

- The aim is to restore middle ear aeration.
- This is done by catheterization or politzerization.
- In mild cases, decongestant nasal drops or oral nasal decongestant with antihistaminic are helpful.
- In the presence of fluid or failure of the above methods, myringotomy may be performed to "unlock" the tube and aspirate the fluid.

Prevention

1. Avoid air travel in the presence of upper respiratory infection or allergy.

2. Swallow repeatedly during descenT. Sucking sweets or chewing gum is useful.

3. Do not permit sleep during descent as number of swallows normally decrease during sleep.

4. Autoinflation of the tube by Valsalva should be performed intermittently during descent.

5. Use vasoconstrictor nasal spray and a tablet of antihistaminic and systemic decongestant, half an hour before descent in persons with previous history of this episode.

6. In recurrent barotrauma, attention should be paid to nasal polyps, septal deviation, nasal allergy and chronic sinus infections.