

Disorders of the Ear - Otitis

The ear is split into three different sections called the external, middle, and inner ear. The external ear is made up of the auricle (or pinna), ear lobe, and the external acoustic meatus. The middle ear begins with the tympanic membrane and includes the auditory ossicles called the malleus, incus and stapes. The inner ear consists of the semicircular canals, cranial nerve VIII, and the cochlea. Each of these areas of the ear can experience inflammation or infection known as otitis. We will discuss these conditions now.

Otitis Externa

Otitis externa is an infection or irritation of the outer ear that manifests with inflammation of the ear canal. It can be caused by infectious agents like *Pseudomonas*, *E. coli* and *S. aureus*. The external ear may also experience irritation from earbuds, hearing aids, and allergies. A risk factor for developing otitis externa is prolonged exposure of the ear to water, which provides a moist environment that promotes bacterial or fungal growth. Because of this risk, otitis externa is often experienced by swimmers and is also referred to as “swimmers ear.” Common manifestations of this condition include redness/inflammation, pruritus (itching), and tenderness/pain with earlobe retraction. Treatment includes using eardrops that contain acidifying agents (acetic acid 5%), antimicrobials, and local anesthetics (benzocaine).

Otitis media

Otitis media is a middle ear infection usually caused by bacteria or viruses. Fever and ear pain are common symptoms and fluid drainage from the ear or hearing loss can also occur. There may be nonspecific signs of otitis media in very young children that includes ear tugging, irritability, nighttime awakening, and poor feeding. Otitis media normally occurs in children ages 3 months to 3 years. Premature infants have increased risk due to smaller and less developed face and throat structures. Infants are more vulnerable to otitis media because they have more horizontal Eustachian tubes that, while narrower, allow easier passage of fluid and pathogens into the middle ear, especially since infants spend so much time in the supine position. A bottle-fed infant has a higher risk of otitis media compared to breast-fed infants presumably because bottle-fed infants are held in a more supine position which facilitates inadvertent milk entry into the middle ear via the Eustachian tubes. Breast-fed infants keep their heads more elevated and also receive antibodies from their mother that can help fight infection. Pacifier use may also contribute to otitis media as saliva and mucus accumulate and possibly drain into the middle ear when the child is in the supine position.

Otitis media may be described in a few different ways depending on how it presents itself:

- **Acute otitis media (AOM)** refers to the rapid onset of signs and symptoms of a middle ear infection. Common agents that cause AOM include *Streptococcus*, *Haemophilus influenzae* and *Mortadella catarrhalis*. Common clinical manifestations of AOM are otalgia (ear pain), fever, and hearing loss. Diagnosis is based on the presence of symptoms and signs of effusion observed with an otoscope. This effusion occurs when the bacteria divide and create exudate behind the tympanic membrane, making it look opaque and red. It also cannot vibrate as well. The main treatment of otitis media is the use of symptom modifying drugs like analgesics for pain. In more severe and chronic cases, ear tubes can be placed to allow fluid drainage and prevent rupture of the tympanic membrane. Placement of the tubes is done by putting holes in the tympanic membrane (myringotomy) and then placing small plastic tubes that allow fluid to drain. Formally these are called tympanostomy tubes, ventilation tubes, or pressure equalization tubes.
- **Otitis media with effusion (OME)** refers to inflammation of the middle ear and the presence of fluid, but no signs or symptoms of an acute infection. OME is generally caused by a poorly functioning eustachian tube that inhibits normal drainage of fluid from the middle ear. A child's risk of OME greatly increases with allergies or colds which result in congestion that can increase fluid collection in the middle ear. Treatment of OME is generally the same as AOM with symptom modifying medication and tubes in cases where symptoms are chronic. It is also helpful to treat any allergies or conditions that might be amplifying upper respiratory tract fluids.

Complications of otitis media include conductive hearing loss, chronic mastoiditis (bacterial infection of cells in mastoid process), rare intracranial complications, and cholesteatomas. Intracranial complications like otogenic meningitis, brain abscess, labyrinthitis, or facial nerve palsy can occur in children with OME. Symptoms hinting that brain structures are involved include persistent headaches, stiff neck, tinnitus, or cranial nerve disturbances like visual troubles or facial paralysis. A **cholesteatoma** is a growth or cyst consisting of keratinized squamous epithelium that expands in the middle ear behind the eardrum. These sloughed off epithelial cells can accumulate around the ear bones so they are unable to vibrate, leading to conductive hearing loss. Cholesteatomas are not cancerous but they can cause a lot of damage as they expand and erode tissue of the middle ear. They can become infected and even drain a foul smelling fluid. A cholesteatoma may be congenital (present from birth) or acquired. Symptoms of a cholesteatoma include discharge from the ear, pain, pressure, and hearing loss. Treatment is usually surgical removal.



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