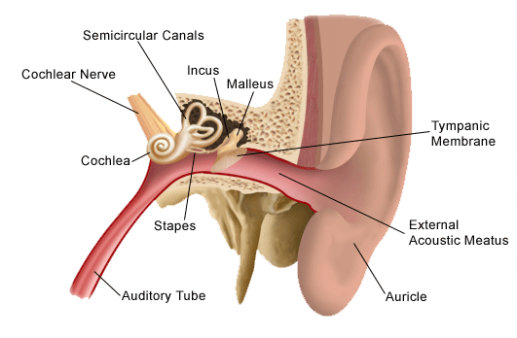
Otitis media



Otitis media is a group of inflammatory diseases of the middle ear. The two main types are acute otitis media (AOM) and otitis media with effusion (OME). AOM is an infection of abrupt onset that usually presents with ear pain. In young children this may result in pulling at the ear, increased crying, and poor sleep. Decreased eating and a fever may also be present. OME is typically not associated with symptoms. Occasionally a feeling of fullness is described. It is defined as the presence of non-infectious fluid in the middle ear for more than three months. Chronic suppurative otitis media (CSOM) is middle ear inflammation of greater than two weeks that results in episodes of discharge from the ear. It may be a complication of acute otitis media. Pain is rarely present. All three may be associated with hearing loss. The hearing loss in OME, due to its chronic nature, may affect a child's ability to learn.

The cause of AOM is related to childhood anatomy and immune function. Either bacteria or viruses may be involved. Risk factors include: exposure to smoke, use of pacifiers, and attending daycare. It occurs more commonly in those who are Native American or who have Down syndrome. OME frequently occurs following AOM but may also be related to viral upper respiratory infections, irritants such as smoke, or allergies. Looking at the eardrum is important for making the correct diagnosis. Signs of AOM include bulging or a lack of movement of the tympanic membrane from a puff of air. New discharge not related to otitis externaalso indicates the diagnosis.

Signs and Symptoms

An integral symptom of acute otitis media is ear pain; other possible symptoms include fever, and irritability (in infants). Since an episode of otitis media is usually precipitated by an upper respiratory tract infection (URI), there often are accompanying symptoms like cough and nasal discharge.

Discharge from the ear, can be caused by acute otitis media with perforation of the ear drum, chronic suppurative otitis media, tympanostomy tube otorrhea, or acute otitis externa. Trauma, such as a basilar skull fracture, can also lead to discharge from the ear due to cerebral spinal drainage from the brain and its covering (meninges).

Causes

The common cause of all forms of otitis media is dysfunction of the Eustachian tube. This is usually due to inflammation of the mucous membranes in the nasopharynx, which in turn can be caused by a viral URI or possibly by allergies. Because of the dysfunction of the Eustachian tube, the gas volume in the middle ear is trapped and parts of it are slowly absorbed by the surrounding tissues, leading to negative pressure in the middle ear. Eventually the negative middle-ear pressure can reach a point where fluid from the surrounding tissues is sucked into the middle ear's cavity (also called tympanic cavity), causing a middle-ear effusion. This is seen as a progression from a Type A tympanogramto a Type C to a Type B tympanogram.

By reflux or aspiration of unwanted secretions from the nasopharynx into the normally sterile middle-ear space, the fluid may then become infected - usually with bacteria. The virus that caused the initial URI can itself be identified as the pathogen causing the infection in the middle ear.

Diagnosis

As its typical symptoms overlap with other conditions, such as acute external otitis, clinical history alone is not sufficient to predict whether acute otitis media is present; it has to be complemented by visualization of the tympanic membrane. Using a pneumatic otoscope with a rubber bulb attached to assess the mobility of the tympanic membrane.

Acute otitis media in children with moderate to severe bulging of the tympanic membrane or new onset of otorrhea (drainage) is not due to external otitis. Also, the diagnosis may be made in children who have mild bulging of the ear drum and recent onset of ear pain (less than 48 hours) or intense erythema (redness) of the ear drum.

To confirm the diagnosis, middle-ear effusion and inflammation of the eardrum have to be identified; signs of these are fullness, bulging, cloudiness and redness of the eardrum. It is important to attempt to differentiate between acute otitis media and otitis media with effusion (OME), as antibiotics are not recommend for OME. It has been suggested that bulging of the tympanic membrane is the best sign to differentiate AOM from OME.

Viral otitis may also result in blisters on the external side of the tympanic membrane, which is called bullous myringitis (myringa being Latin for "eardrum").

However, sometimes even examination of the eardrum may not be able to confirm the diagnosis, especially if the canal is small. If wax in the ear canal obscures a clear view of the eardrum it should be removed using a blunt cerumen curette or a wire loop. Also, an upset

young child's crying can cause the eardrum to look inflamed due to distension of the small blood vessels on it, mimicking the redness associated with otitis media.

Acute otitis media

The most common bacteria isolated from the middle ear in AOM are Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis.[

Otitis media with effusion

Otitis media with effusion (OME), also known as serous otitis media (SOM) or secretory otitis media (SOM), and commonly referred to as glue ear, is simply a collection of effusion (fluid) that occurs within the middle-ear space due to the negative pressure produced by dysfunction of the Eustachian tube. This can occur purely from a viral URI, with no pain or bacterial infection, or it can precede and/or follow acute bacterial otitis media. Fluid in the middle ear frequently causes conductive hearing impairment, but only when it interferes with the normal vibration of the eardrum by sound waves. Over weeks and months, middle-ear fluid can become very thick and glue-like, which increases the likelihood of its causing conductive hearing impairment. Early-onset OME is associated with feeding of infants while lying down, early entry into group child care, parental smoking, lack, or too short a period of breastfeeding and greater amounts of time spent in group child care, particularly those with a large number of children, increases the incidences and duration of OME in the first two years of life.

Chronic suppurative otitis media

Chronic suppurative otitis media, incorrectly called chronic otitis media or chronic ear infection, involves a hole in the tympanic membrane and active bacterial infection within the middle-ear space for several weeks or more. There may be enough pus that it drains to the outside of the ear (otorrhea), or the purulence may be minimal enough to only be seen on examination using the otoscope or more effectively with a binocular microscope by an otolaryngologist. This disease is much more common in persons with poor Eustachian tube function, and very common in certain races such as Native North Americans. Hearing impairment often accompanies this disease.

Adhesive otitis media

Adhesive otitis media occurs when a thin retracted ear drum becomes sucked into the middle-ear space and stuck, i.e. adherent, to the ossicles and other bones of the middle ear.

Prevention

Long term antibiotics while they decrease rates of infection during treatment, have an unknown effect on long term outcomes such as hearing loss. This method of prevention has been associated with emergence of antibiotic-resistant otitic bacteria. They are thus not recommended.

Pneumococcal conjugate vaccines when given during infancy decrease rates of acute otitis media by 6–7% and if implemented broadly would have a significant public healthbenefit., Influenza vaccine is recommended annually.

Risk factors such as season, allergy predisposition and presence of older siblings are known to be determinants of recurrent otitis media and persistent middle-ear effusions (MEE). Previous history of recurrence, environmental exposure to tobacco smoke, use of daycare, and lack of breastfeeding have all been associated with increased risk of development, recurrence, and persistent MEE. Thus, cessation of smoking in the home should be encouraged, daycare attendance should avoided or daycare facilities with the fewest attendees should be recommended, and breast feeding should be promoted.

There is some evidence that breastfeeding for the first twelve months of life is associated with a reduction in the number and duration of OM infections. Pacifier use, on the other hand, has been associated with more frequent episodes of AOM.

Evidence does not support zinc supplementation as an effort to reduce otitis rates except maybe in those with severe malnutrition such as marasmus.

Management

Oral and topical pain killers are effective to treat the pain caused by otitis media. Oral agents include ibuprofen, paracetamol (acetaminophen), and opiates. Topical agents shown to be effective include antipyrine and benzocaine ear drops.[30] Decongestants and antihistamines, either nasal or oral, are not recommended due to the lack of benefit and concerns regarding side effects. Half of cases of ear pain in children resolves without treatment in three days and 90% resolves in seven or eight days.

Antibiotics

It is important to weigh the benefits and harms before using antibiotics for acute otitis media. As over 80% of acute episodes settle without treatment, about 20 children must be treated to prevent one case of ear pain, 33 children to prevent one perforation, and 11 children to prevent one opposite side ear infection. The harms include, for every 14 children treated one child has an episode of either vomiting, diarrhea or a rash. If pain is present, treatment to reduce it should be initiated.

•Antibiotics should be prescribed for severe bilateral or unilateral disease in all infants and children with severe signs and symptoms, such as moderate to severe ear pain and high fever.

•For bilateral acute otitis media in infants younger than 24 months of age, without severe signs and symptoms, antibiotics should be prescribed.

•When non-severe unilateral acute otitis media is diagnosed in young children either antibiotic therapy is given, or observation with close follow-up based on joint decision making between parent(s)/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.

•In children 24 months or older with non-severe disease can have either antibiotics or observation.

The first line antibiotic treatment, if warranted, is amoxicillin. If there is resistance or use of amoxicillin in the last 30 days, then amoxicillin-clavulanate or another penicillin derivative plus beta lactamase inhibitor is recommended. Taking amoxicillin once a day may be as effective as twice, or three times a day. While less than 7 days of antibiotics have less side effects, more than seven days appear to be more effective. If there is no improvement after 2–3 days of treatment a change in therapy may be considered.

A treatment option for chronic suppurative otitis media with discharge is topical antibiotics. A Cochrane review found that topical quinolone antibiotics can improve discharge better than oral antibiotics. Safety is not really clear.

Tympanostomy tube

Tympanostomy tubes (also called a "grommet") are recommended in those people who have 3 or more episodes of acute otitis media in 6 months or 4 or more in a year, with at least one episode or more attacks in the preceding 6 months. In chronic cases with effusions, insertion of tympanostomy tube into the eardrum reduces recurrence rates in the 6 months after placement but has little effect on long term hearing. A common complication of having a tympanostomy tube is otorrhea, which is a discharge from the ear. Oral antibiotics should not be used to treat uncomplicated acute tympanostomy tube otorrhea. Oral antibiotics are not a sufficient response to bacteria which cause this condition and have significant side effects including increased risk of opportunistic infection. In contrast, topical antibiotic eardrops can treat this condition.

Alternative medicine

Complementary and alternative medicine are not recommended for otitis media with effusion because there is no evidence of benefit. An osteopathic manipulation technique called the

Galbreath technique was evaluated in one randomized controlled clinical trial; one reviewer concluded that it was promising, but a 2010 evidence report found the evidence inconclusive.

Outcomes

Complications of acute otitis media consists of perforation of the ear drum, infection of the mastoid space behind the ear (mastoiditis), and more rarely intracranial complications can occur, such as bacterial meningitis, brain abscess, or dural sinus thrombosis. It is estimated that each year 21 thousand people die due to complications of otitis media.

Membrane Rupture

In severe or untreated cases, the tympanic membrane may perforate, allowing the pus in the middle-ear space to drain into the ear canal. If there is enough of it, this drainage may be obvious. Even though the perforation of the tympanic membrane suggests a highly painful and traumatic process, it is almost always associated with the dramatic relief of pressure and pain. In a simple case of acute otitis media in an otherwise healthy person, the body's defenses are likely to resolve the infection and the ear drum nearly always heals. An option for severe acute otitis media in which analgesics are not controlling ear pain is to perform a tympanocentesis, i.e. needle aspiration through the tympanic membrane to not only relieve the ear pain but to identify the causative organism(s).

Hearing Loss

Children with recurrent episodes of acute otitis media and those with otitis media with effusion or chronic suppurative otitis media, have higher risks of developing conductive and sensorineural hearing loss. Globally approximately 141 million people have mild hearing loss due to otitis media (2.1% of the population).[44] This is more common in males (2.3%) than females (1.8%).

This hearing loss is mainly due to fluid in the middle ear or rupture of the tympanic membrane. Prolonged duration of otitis media is associated with ossicular complications, and together with persistent tympanic membrane perforation contributes to the severity of both the disease and the hearing loss. When a cholesteatoma or granulation tissue is present in the middle ear, the degree of hearing loss and ossicular destruction is even greater.

Periods of conductive hearing loss from otitis media may have a detrimental effect on speech development in children. Some studies have also linked otitis media to educational problems, attention disorders, and problems with social adaptation. Furthermore it has been demonstrated that patients suffering from otitis media have more depression/anxiety-related disorders compared to individuals with normal hearing. Once the infections resolve and hearing

thresholds return to normal, childhood otitis media may still cause minor and irreversible damage to the middle ear and cochlea.

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