



Understanding More the Dynamics of Otitis Media with Future Perspective

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Abstract

Otitis media is perhaps the most prevalent infectious diseases of pediatrics age group. It has increased risk of complications. This review explains the epidemiology, pathogenesis presenting features, diagnosis, treatment options and complications of otitis media.

Keywords: Otitis Media (OM); Middle Ear Cleft; Glue Ear; Middle Ear Effusion (MEE); Tympanometry Tympanostomy Tubes; Eustachian Tube; Mastoid; Aditus

Introduction

Otitis media is defined as an inflammation of the middle ear cleft, in fact it is an infection of the mucous membrane of the whole of the ear cleft including Eustachian tube tympanic cavity, aditus, and mastoid antrum Otitis media (OM) is a collective term for a group of inflammatory and infective conditions affecting the middle ear There are various types. These include acute otitis media (AOM), otitis media with effusion (OME), and chronic suppurative otitis media (CSOM), acute Otitis media (AOM) is acute inflammation of the middle ear which is caused by different kinds of infective microorganism's bacteria or viruses. There is an effusion of glue like fluid in the absence of signs and symptoms of acute inflammation, the air which is normally present in the middle ear is replaced by fluid which at times is thick like glue, and this is why the condition is called "glue ear.

Since time immemorial human beings have suffered from this disease and its complications. Studies of old Egyptian mummies reveal perforations of the tympanic membrane and destruction

of the mastoid. Evidence of middle ear disease was also evident in skeletal material from a prehistoric population. Prior to the introduction of antimicrobial agents, otitis media either used to resolve spontaneously via central perforation of the tympanic membrane mastoiditis and intracranial complications were common Although very rare now but still complications from untreated middle ear infections can include: Labyrinthitis: an infection of the inner ear that causes dizziness and imbalance, Mastoiditis an inflammation of the mastoid region and Meningitis inflammation of the meninges.

Tympanosclerosis is scarring or thickening of the eardrum. Even today Otitis media with effusion (OME) or glue ear in children is one of the most common conditions encountered by the practicing otorhinolaryngologists

Impact of the problem volumes high

Acute inflammation of middle ear cleft usually starts as viral infection followed by bacterial infection. Causative organisms are Haemophilus, Influenzae, Pneumococci, Branhamella, Catarrhalis, and Streptococcus Hemolyticus. Otitis Media with Effusion (OME)

also known as Secretory Otitis Media or glue ear is one of the commonest causes of preventable deafness among Paediatric population. Otitis media is a very common childhood disease, affecting the child's hearing at the most critical age of two years, the Child's speech and language development and its education, therefore the problem has to be treated with special consideration [1]. OM is one of the most common diagnoses made in the pediatrician's clinic, its incidence is alarmingly and apparently increasing. The incidence of OM increases after the newborn period (first 28 days). It is studied that by age 12 months nearly two-thirds of all children had at least one episode of AOM. By three years, 46% of children had three or more episodes of AOM. The highest incidence of AOM for both sexes was found in children aged 6 to 11 months. The onset of OM during the first year of life is important because the majority of children with multiple recurrences of OM have their first episode before the age of 12 months. The incidence decreases with increasing age i.e. from 40% at two years to 1.4% at 11 years [2]. Environmental factors such as pollution, seasonal variation with a peak in winter and recurrent upper respiratory tract infections are usually associated with high incidence [3]. Socio-economic factors, poor hygiene, crowding, poor diet, poor education, and poor healthcare facilities increase the incidence of the disease [4]. Incidence varies according to geography and race with preponderance to Blacks and this could be genetic but Eustachian tube variations and anatomical skull base may be significant. At least one episode of OME is seen by age ten in ninety percent of cases. Many episodes are short-term but they do occur or recur frequently Types of otitis media is based on the time process of the disease. Acute otitis media (AOM) is an inflammation of the middle ear that presents with a rapid onset of signs and symptoms, such as pain, fever, irritability and vomiting. Chronic disease implies middle ear fluid that has been present for three months or longer. The subacute stage is the time in between with many synonyms, including serous OM, secretory OM, and "glue ear".

The severity and the extension of the disease is based on its nature of pathogenesis There is a high incidence of persistent middle ear effusion (MEE) occurring after an episode of AOM. One study found that the mean duration of otitis media with effusion (OME) after AOM was 40 days. In a study it was shown that children who were less than 24 months of age were 3.8 times more likely to have persistent MEE than children who were older. The incidence of OM parallels the incidence of upper respiratory tract infections, which

are most prevalent during the winter months and is least common during the summer suggesting it to be a complication of an upper respiratory tract infection it has been found that MEE originating in the winter months appears to last longer than those occurring in the summer months.

There is data strongly suggesting a genetic susceptibility to OM. Variables associated with an increased risk of AOM include a sibling history of recurrent OM. Breast-feeding has been suggested as an important factor in prevention of respiratory tract infections and middle ear disease in infancy. Many studies have shown an inverse relationship between the incidence of middle ear disease and the duration of breast-feeding [5].

The mechanism of the protective effect of breast milk remains obscure. There is also an increased risk in children whose mothers smoked [6]. Children in group care settings as well as children who are exposed to cigarette smokers are more prone to middle ear infections. Children on bottle fed are more prone to otitis media. Passive smoke exposure has come under increased scrutiny as a risk factor for respiratory tract infections, including OM, Many associated medical conditions predispose a child to OM. Cleft palate and craniofacial anomalies, especially if the midface is involved, appear to have an increased risk of OM. There is an increased incidence of OM in children with congenital or acquired immune dysfunction Nasal obstruction from enlarged adenoids, sinusitis, and malignancy can also lead to OM [7]. It is quite possible that tonsil and adenoid may act as a source of infection.

Cascade of events

The Eustachian tube connects the middle ear and mastoid air cells to the nasopharynx the sequence of events in acute otitis media are organism Invade the mucous membrane causing inflammation or edema, which closes Eustachian tube preventing aeration and drainage. Pressure from the edema causing the drum to bulge. Necrosis of tympanic membrane results in perforation. The ear continues to drain until the infection resolves the nasal cavities and palate also constitute part of this system and may influence the function of the Eustachian tube. In the adult, the anterior two-thirds of the tube are cartilaginous and the posterior third is bony; in the infant, the bony portion is relatively longer. In adults, the tube lies at an angle of 45 degrees in relation to the horizontal plane, whereas in infants this inclination is only ten degrees.

The aural orifice of the tube is oval, measuring 5 mm high and 2 mm wide in the adult. The nasopharyngeal orifice in the adult is a vertical slit at right angles to the base of the skull, but in the infant this opening is oblique owing to the more horizontal position of the cartilage. The diameter of the orifice is 8 to 9 mm in the adult and 4 to 5 mm in the infant. In the newborn, the nasopharyngeal orifice lies in the plane of the hard palate, but in the adult it is situated 10 mm above this plane. The middle portion, or isthmus, of the Eustachian tube is not sharply constricted but is relatively long, with gradual widening at each end to form the aural and nasopharyngeal orifices. The mucosal lining of the Eustachian tube is similar to mucosa elsewhere in the respiratory tract, including mucus-producing gland cells, ciliated cells, and plasma cells. The mucosa in the bony portion of the Eustachian tube is similar to that of the middle ear and contains both mucus-producing elements and ciliated cells. Ciliary dysfunction frequently predisposes a child to OM. Eustachian tube is closed normally but it opens during swallowing, yawning, and sneezing, permitting the air pressure in the middle ear to equalize with atmospheric pressure.

Signs and symptoms of otitis media

Otitis Media becomes more difficult to diagnose because children are unable to give proper history. Eustachian Tube blockage is seen commonly because in children Eustachian tube is more horizontally placed and is shorter, this contributes to Otitis Media in the following ways. The Eustachian tube usually opens regularly to ventilate or replenish the air in the middle ear and to equalize its air pressure to that of the environment but in blocked tube due to an upper respiratory illness such as common cold, flu, throat infection and ear infections this is jeopardized. Enlarged adenoids represent another factor that makes children more susceptible to Otitis Media. The enlarged adenoids can interrupt the tube opening. In addition, adenoids may themselves get infected, thereby spreading infection into the Eustachian tubes, a blocked Eustachian tube, either due to swelling of its lining or plugged with mucus, cannot open adequately to ventilate the middle ear which in turn interferes the drainage of fluid which gets collects in the middle ear. The degree of angle of the Eustachian tube in children is more favorable for bacteria from the nose and throat to enter the middle ear. If a child has repeated episodes of infection or otitis media is suspected then it requires immediate attention and evaluation by an audiologist because Otitis Media may result in serious complications if not

treated. Infection from middle ear can reach near parts including brain. Persistent fluid in the middle ear restricts the eardrum and the three middle ear bones movements resulting in mild to moderate hearing loss, which is critical for speech and language development, in that period of time.

Medical treatment

The last few years have witnessed tremendous success in reduction in morbidity and prevention of life-threatening complications of otitis media. Prompt treatment of middle ear infections with antibiotics is vital to prevent complications but warrant the routine use of antimicrobial agents due to emerging trend of multidrug-resistant strains of bacterial pathogens in this disease. Oral antibiotics can be given. A full ten-day course of antibiotics, should be prescribed for very young children and for those with complications. When deciding whether or not to treat with an antimicrobial agent, an ear swab from the ear discharge may be taken to determine the culture and sensitivity of the infecting microorganism, it is most mandatory to take a swab for culture to determine the evidence of infection and to give antibiotic accordingly since most effusions resolve spontaneously within two or three months. Inappropriate use of antibiotics encourages the multidrug-resistance. Children should be encouraged to blow the nose frequently to prevent mucous stagnating and becoming infected. Decongestant nasal sprays and douching should be tried for a short period of time. Eustachian tube dysfunction should be addressed in more effective way if secretions are more than normal. Systemic antihistamines should be part of the regimen, because allergic swelling of the mucosa around the margins of the Eustachian tube may be a factor. Mastoiditis should be excluded to avoid serious risks.

Surgical treatment

Surgical options are usually reserved for patients who do not improve with medical therapy and include myringotomy with tube insertion with or without adenoidectomy.

Myringotomy is performed and fluid in the middle ear is gently sucked out. A small tympanostomy tube (grommet) is then placed through the eardrum to prevent the myringotomy from closing and to help clear the middle ear fluid. Additionally if the child has enlarged or infected adenoids, the otolaryngologist may recommend an adenoidectomy at the same time.

Conclusion

The future perspective is the development of vaccines against those bacteria which are pathogenic for otitis media. At present, they are still in the experimental stage but change is synonymous of advancement and advancement means progress to something better and new and this is the future perspective.

Bibliography

1. Abdul Cader SH., *et al.* "A Comparative Study of Efficacy of Different Surgical Management Options and Hearing Outcome in Children with Otitis Media with Effusion". *Otolaryngology Open Access Journal* 1.3 (2016): 000114.
2. Richard AM. "London Butterworth". 6.5 (1987): 159-176.
3. Zielhuis GA., *et al.* "Environmental risk factors for otitis media with effusion in preschool children". *Scandinavian Journal of Primary Health Care* 7.1 (1989): 33-38.
4. Kiris M., *et al.* "Prevalence and risk factors of otitis media with effusion in school children in Eastern Anatolia". *International Journal of Pediatric Otorhinolaryngology* 76.7 (2012): 1030-1035.
5. Bluestone CD and Klein JO. "Otitis Media with Effusion, Atelectasis, and Eustachian Tube Dysfunction. Pediatric Otolaryngology". *Bluestone and Stool* (1983): 356-512.
6. Klein JO., *et al.* "Epidemiology and Natural History. Recent Advances in Otitis Media". Supplement to *Annals of Otology* (1998).
7. Nyquist AC., *et al.* "Antibiotic prescribing for children with colds, upper respiratory tract infections, and bronchitis". *JAMA* 279 (1998): 875-877.