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Review Article

Otitis media among elderly: incidence, complication and prevention

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ABSTRACT

Though often considered a disease of children, otitis media can affect the elderly. The incidence of otitis media among elderly population is variable among countries, but generally low, with a value ranging from 0.25-9%. However, dangerous complications may occur. Otitis media is a complex spectrum of diseases that include acute otitis media, otitis media with effusion, suppurative otitis media, and mastoiditis. Otitis media in elderly doesn't feature the classical presentation in children. Elderly patients experience otalgia with or without hearing loss or signs of inflammation. Infection may spread to either to adjacent structures leading to mastoiditis, petrositis, labyrinthitis, or facial nerve palsy, or intracranially leading to meningitis, subarachnoid abscess, subdural abscess, encephalitis, brain abscess, lateral or sigmoid venous sinus thrombosis, and otitis hydrocephalus. The mainstay strategies for prevention of otitis media are the adequate proper treatment of each infection, and tight control of modifiable risk factors such as tobacco smoking, immunosuppression, upper respiratory tract infection, allergy, and craniofacial abnormalities. Antimicrobial treatment should be continued for at least 10-14 years.

Keywords: Otitis media, Elderly, Geriatric, Incidence, Complications, Prevention

INTRODUCTION

Otitis media is one of the most common causes of healthcare visits worldwide, and it is a major cause of hearing loss when left untreated.[1] Otitis media involves a spectrum of pathological conditions that affect the middle ear or its lining mucosa. The main diseases involved in otitis media spectrum are acute otitis media, otitis media with effusion, chronic suppurative otitis media, and mastoiditis.[2] Acute otitis media refer to an acute inflammatory condition involving the middle ear that occur due to viral or bacterial infection. It is characterized by the formation of purulent fluid behind a bulging tympanic membrane associated with local or systemic inflammation.[3] Otitis media with effusion, on the other hand, is a chronic inflammatory disease that often follow unsuccessfully-treated acute otitis media. This condition is characterized with the presence of effusion behind an intact tympanic membrane without signs or symptoms of local or systemic illness.[4] Chronic suppurative otitis media refers to long-standing inflammation of middle ear leading to suppuration and persistent perforation of tympanic membrane.[5] When acute otitis media infection spreads to adjacent structures, it causes acute inflammation of periosteum and air cells in the mastoid process leading to "mastoiditis".[6]

OTITIS MEDIA AMONG ELDERLY

Otitis media is usually classified as a disease of children. However, it can also occur among adults and elderly. A literature review conducted in 2012 stated that the global

annual incidence of acute otitis media was 10.85%, with half of them occurring under the age of five.[1] The incidence among adults and elderly is generally estimated to be around 0.25%.[7] However, other studies reported a figure of up to 9%.[5,8] Chronic suppurative otitis media is estimated to be the second most common ear disease affecting elderly after impacted cerumen.[8] It is reported that 33 out of 10 million patients die due to middle ear complications, especially among children.[1]

CLINICAL PRESENTATION AND DIAGNOSIS OF OTITIS MEDIA AMONG ELDERLY

Clinical presentation

In general, patients with acute otitis media experience otalgia, ear discharge, and hearing impairment. However, elderly do not usually present with these classical symptoms. Otalgia is a more common presenting symptom among elderly that may occur without fever or signs of inflammation. It may be the only presenting symptom.[7] Hearing loss and dizziness are common. Vertigo and facial nerve palsy denote that the infection extended and eroded the labyrinthine bone. It is not uncommon that viral infection causing otitis media extend to cause labyrinthitis or vestibular neuritis. Bacterial infection may less often result in similar conditions.[6] The most common causative organisms are *Streptococcus pneumoniae*, *Hemophilus influenza*, and *Moraxella catarrhalis*.[4,6,9]

Diagnostic approach

Otoscopic examination of ear can reveal various findings in cases with otitis media. A bulging tympanic membrane with purulent fluid behind suggests bacterial otitis media.[10,11] If the tympanic membrane was perforated, the purulent discharge should be collected and analyzed. Culture and sensitivity help in diagnosis of the causative organism and guiding the choice of antibacterial agents. In rare cases, computed tomography (CT) of the ear, mastoid process and temporal bone may be indicated to demonstrate anatomy and local spread of infection and/or erosion of adjacent structures.[12]

COMPLICATIONS OF OTITIS MEDIA

Common complications of otitis media include otitis media with effusion, tympanic membrane perforation, and chronic suppurative otitis media. The development of otitis media with effusion among the elderly should warrant searching for eustachian tube abnormalities. Other causes may include large adenoids or tonsils, nasal septal deviation, nasopharyngeal tumors, head and neck surgery or radiotherapy. Unlike children, middle ear effusion in elderly is a dangerous sign that should be thoroughly investigated.[13] As aforementioned, acute otitis media is a viral inflammation that often follow an upper respiratory tract infection. Local pharyngeal congestion leads to occlusion of eustachian tubes which consequently creatures a negative pressure inside the middle ear leading to formation of a serous effusion. Because of its stagnation, this serous fluid acts as a good medium for bacterial growth and bacterial infection.[4,6] If left untreated, the infection will result in tympanic membrane perforation, will extend to adjacent mastoid air cells and periosteum leading to mastoiditis, or spread intracranially leading to meningitis.[5,14] However, the incidence of such severe complications is low in adults with a figure of one case per 300,000 adults per year. Mastoiditis is commoner than intracranial complications with values of 80% and 20% of severe complications, respectively. Hearing loss is another major complication of otitis media. It is estimated that one in each four patients with severe complications due to otitis media develop permanent hearing loss.[15] Spread of infection to labyrinth leads to acute labyrinthitis and facial palsy. Patients with acute labyrinthitis experience vertigo and imbalance, whereas patients with facial palsy develop acute mouth deviation and difficulty with eye closure. Further spread of infection may lead to petrositis, meningitis, subarachnoid abscess, subdural abscess, encephalitis, brain abscess formation, sigmoid sinus venous thrombosis, lateral venous sinus thrombosis, and otitic hydrocephalus.[3,5,15] Patients with such intracranial complications present with fever, headache, mental state changes, neck rigidity, blurring of vision, with or without focal neurological deficits. Acute necrotic otitis is another major complication of otitis media. In rare cases, otitis media may lead to systemic complications such as bacteremia, septicemia, bacterial endocarditis, and septic arthritis.[16,17]

Management of otitis media complications is variable and depends on the complication itself. For instance, antibiotics are given in cases of infection spread to nearby structures, and more aggressive conditions such as systemic spread of infection require intensive care and advanced management of general condition as well as sepsis. Because, management of complications is often more tedious, required additional costs, and carries a poor prognosis, prevention of otitis media as well as its early proper treatment is fundamental to prevent complications.

PREVENTION OF OTITIS MEDIA

In spite of the rarity of otitis media incidence among elderly, the dangerous complications necessitate adopting preventive measures among elderly patients, particularly those experiencing recurrent otitis media. Recurrent otitis media is defined as experiencing at least three relapses of acute middle ear infections in a six-month period, or at least four annual episodes.[13] The two mainstay strategies for prevention of otitis media among elderly are to identify and adequately control modifiable risk factors and to properly and sufficiently treat each ear infection.

Important risk factors for otitis media include smoking, immunosuppression (such as diabetes mellitus, or chronic use of immunosuppressants), upper respiratory tract

infection, allergy, chronic sinusitis, eustachian tube dysfunction, and craniofacial abnormalities (such as cleft palate).[19] Cessation of smoking, tight control of diabetes, treatment of allergy and respiratory infection, and surgical correction of anatomical abnormalities are essential preventive strategies. Proper antibiotic selection and ensuring patient compliance through the whole course of treatment are vital. For *Streptococcal pneumoniae*, *Haemophilus influenza*, and *Moraxella catarrhalis* infection, high-dose amoxicillin or amoxicillin–clavulanate are effective. Cephalosporins (such as cefuroxime or cefdinir), penicillin, beta-lactam, and fluoroquinolones are other alternatives. Treatment duration should range from 10-14 days at least.[4-6] Treatment for shorter periods may lead to inadequate control of infection and the evolution to otitis media with effusion or chronic suppurative otitis media.[6,19]

CONCLUSION

Otitis media is a complex spectrum of diseases that include acute otitis media, otitis media with effusion, suppurative otitis media, and mastoiditis. Otitis media occur among 0.25% to 9% of elderly. In spite of being less prevalent than among children, dangerous complications may occur. Otitis media in elderly doesn't feature the classical presentation in children. Elderly patients experience otalgia with or without hearing loss or signs of inflammation. Infection may spread to either to adjacent structures leading to mastoiditis, petrositis, labyrinthitis, or facial nerve palsy, or intracranially leading to meningitis, subarachnoid abscess, subdural abscess, encephalitis, brain abscess, lateral or sigmoid venous sinus thrombosis, and otitis hydrocephalus. The mainstay strategies for prevention of otitis media are the adequate proper treatment of each infection, and tight control of modifiable risk factors such as tobacco smoking, immunosuppression, upper respiratory tract infection, allergy, and craniofacial abnormalities. Antimicrobial treatment should be continued for at least 10-14 years.

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