

EDITORIAL

Current Drug Therapy of Acute Otitis Media

Acute otitis media (AOM) or acute suppurative otitis media (ASOM) is one of the most common clinical problems encountered in otorhinolaryngology practice in our country. Majority of the patients are children.

What is acute otitis media?

Acute otitis media is a state of middle ear mucosal infection caused by bacterial organism, producing acute symptoms of pain ear, hearing loss and even fever especially in younger children. Spontaneous perforation of the tympanic membrane with accompanying purulent discharge may develop if not treated earlier. When this inflammation is accompanied by sterile fluid in the middle ear, it is referred to as otitis media with effusion (OME) or secretory OM. Recurrent AOM is the occurrence of three or more episodes of AOM within six months or four months. Chronic suppurative otitis media (CSOM) refers to chronic otorrhoea, of more than six weeks duration, through a perforated tympanic membrane, accompanied by chronic inflammation of mastoid.

Otalgia (ear-pulling) in very young children is the only specific symptom of AOM. Other features include irritability and in some, fever (upto 40.5 C.) Conductive deafness and occasionally vertigo may also develop. On otoscopic examination,

the tympanic membrane appears typically erythematous or pale yellow (if pus is present), opaque, full to the point of bulging, and poorly mobile.

Which microbes are responsible?

The middle ear aspirates show aerobic bacteria in more than three fourths of cases. *Streptococcus pneumoniae* (25-45%), *Haemophilus influenzae* (20-30%), *Moraxella catarrhalis* (8-20%), and *Streptococcus pyogenes* (3-4%) are the most commonly isolated organism. In the first six weeks after birth, gram negative enteric pathogens and *Staphylococcus aureus* may be found in 10-20% cases. In adults, *Strep. pyogenes*, *Staph. aureus* and *H. influenzae* are the important pathogens. Most of the *M. catarrhalis* and a third of *H. influenzae* isolated from the middle ear, are beta-lactamase producing species¹. In a recent report, 52% of children with treatment failure and 26% of children with a new episode of AOM showed beta-lactamase producing pathogens in their middle ear isolates. Thus, beta-lactamase is probably responsible for the treatment failure in half the children who suffer a relapse.²

How to manage Acute Otitis Media?

Though otitis media was essentially thought to be a self limiting illness, it has been conclusively shown that prompt therapy with the appropriate antimicrobials decreases the morbidity, time

for resolution and risk of developing complications³ in the cases with AOM. The decision to use antimicrobials in otitis media with effusion is under study, as some papers suggest a beneficial response while others disagree^{4,5}.

Supportive therapy

Analgesics should be administered three to four times a day. Oral paracetamol in a dose of 10-15 mg/kg/dose is preferred for children, as aspirin use under the age of twelve years may be associated with Reye's syndrome. Aspirin is the preferred agent for adults due to its efficacy, safety, low cost and universal availability. Seldom, the pain may be so severe that, narcotic analgesics may be required initially. Warm compresses to the external ear and (if no perforation is present) ototopical analgesic drops may be helpful. Oral decongestants and antihistaminics are ineffective in hastening the resolution in non allergic patients with OME⁶.

Amoxicillin and cotrimoxazole are the agents of choice for AOM. Other agents which may be used are erythromycin, roxithromycin, cefaclor, and cefixime. Fluoroquinolones as a broad class, are ineffective against gram positive organisms and their use in these conditions has been discouraged^{7,8}. Recently, a new fluoroquinolone, sparfloxacin has been reported to possess good activity against some gram positive bacteria⁹.

Amoxicillin — is a broad spectrum penicillin, with good efficacy against non beta-lactamase producing, gram positive organisms. Its relative safety, patient acceptability, availability and cost, all favour the use of amoxicillin as a first line agent.

The side effects encountered are mild and include diarrhoea and rashes. Alternative agents should be used in the following situations :

(a) Penicillin allergy (amoxicillin and clavulanic acid combination is also contra-indicated). (b) AOM caused by a beta lactamase producing organism. (c) Persistence of fever after 48 - 72 hours of starting amoxicillin. (d) Otitis-conjunctivitis syndrome. (e) Location in an area of the country where prevalence, of beta-lactamase producing strains of middle ear pathogens, is high.

Amoxicillin and clavulanic acid combination — This is a good agent for use when beta-lactamase producing organisms are encountered. Clavulanic acid is a beta-lactamase enzyme inhibitor, and its addition to amoxicillin extends the bactericidal activity of amoxicillin to those resistant organisms which produce this enzyme. However, the incidence of diarrhoea is slightly more than observed with amoxicillin alone and this is more expensive.

Cotrimoxazole — is a combination of trimethoprim with sulfamethoxazole, in a ratio of one is to five respectively. Both these agent act synergistically to exert a 'sequential block' on the folic acid synthesis. It is efficacious, relatively safe and inexpensive. Side effects observed include epigastric discomfort, crystalluria, hypersensitivity reactions in 2 - 5 % patients, haemolysis in glucose-6 phosphate dehydrogenase deficient individuals. The use of sulfonamides may precipitate kernicterus in neonates, by displacing

bilirubin from its binding sites on plasma proteins.

Erythromycin — is a macrolide antibiotic, which has antibacterial spectrum of activity similar to the penicillin group. Unfortunately, the use of erythromycin as first line agent is hampered by erratic bioavailability of oral preparations, acid lability of the drug, inconvenient dosing frequency and the incidence of severe gastro-intestinal irritation in susceptible individuals. It is however, a useful second line agent for patients unable to take or not responding to the first line drugs. Roxithromycin - is a macrolide, developed to overcome some of the drawbacks of erythromycin. Its spectrum of activity is similar to erythromycin, but it is acid stable, shows better bioavailability after oral administration, has a convenient (twice daily) dosing schedule and causes less gastro-intestinal irritation¹⁰ It is however, more expensive.

Cephalosporins—like cefaclor and cefixime, have the same mechanism of action, spectrum of activity and side effect profile as the penicillins. They are both expensive, and cannot be used in patients who are allergic to penicillin. Cephalosporins are also susceptible to degradation by the beta-lactamases, as they too possess a beta-lactam ring in their chemical structure. Side effects seen with this group of antibiotics are diarrhoea and hypersensitivity reactions like erythema multiforme and serum sickness.

Fluoroquinolones — a relatively new group of antimicrobials, exert their

bactericidal effect by inhibiting the A sub-unit of the bacterial DNA gyrase enzyme. This enzyme is responsible for the uncoiling and super-coiling of DNA strands during multiplication. Numerous members of this group are available in India, namely norfloxacin, ciprofloxacin, ofloxacin, pefloxacin, lomefloxacin and sparfloxacin. These agents are active against the *Enterobacteriaceae spp. e.g. Salmonella, shigella, Escherichia etc.* and other gram negative organisms, but display poor activity against gram positive organisms, especially *Streptococcus spp.* The use of fluoroquinolones in AOM is irrational and bears the risk of propagating resistant strains of pathogens. Recent reports suggest that sparfloxacin has extended spectrum of antibacterial activity and active against some gram positive organisms also.

Conclusion

In developing countries like India, where poor hygiene and malnourishment are rampant, the incidence of otitis media is high. It has been conclusively shown that prompt therapy with the appropriate antimicrobials decreases the morbidity, duration of illness and the risk of complications.¹¹⁻¹² Both amoxicillin and cotrimoxazole are effective, safe and inexpensive agents, and may be regarded as the drugs of choice. Second line agents are available for those patients who cannot tolerate or are not responding to the first line agents. Newer agents like sparfloxacin are under evaluation.

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