

## Acute Otitis Media: A simple diagnosis, a simple treatment

Chhetri SS<sup>1</sup>

<sup>1</sup>Dept. of ENT-HNS, Lecturer, Kathmandu Medical College and Teaching Hospital, Sinamangal, Kathmandu, Nepal.

**Corresponding author:** Dr. Sujan Singh Chhetri Dept. of ENT-HNS, Kathmandu Medical College and Teaching Hospital, Sinamangal, Kathmandu, Nepal.

### ABSTRACT

To assess the symptoms and signs of acute otitis media and efficiency of simple antibiotics like amoxicillin in its treatment in the primary health care setup. This is a prospective longitudinal study including 204 patients from different institutions. Patients were diagnosed as suffering from acute otitis media when presented with earache, fever, fullness and or otorrhea. Patients were divided into two equal groups on basis of the treatment they received, Group A received only symptomatic treatment while Group B were given Amoxicillin (40mg/kg/day) for 7 days.

Acute otitis media was common in children under 15 years (64.7%). Patients presented with earache (100%), aural fullness (90.68%), fever (76.47%) associated with recent onset of upper respiratory tract infections (88.23%). In group A, improvement was noticed in 28.43% in 3 days while 35.29% in 7 days. In group B, improvement was noticed in 48.03% in day 3 while 86.27% in day 7. In countries where medical care is scarce, patients lost to follow up, it is wise to treat with simple antibiotics like amoxicillin in adequate dose than to treat only symptomatically. It prevents chronicity, early hearing impairments and reduces antibiotic resistance.

**Keywords:** Acute Otitis Media, Amoxicillin, Antibiotic resistance, Earache

### INTRODUCTION

Acute Otitis Media is a pyogenic infection of the middle ear cleft that last for less than 3 weeks. It is more common in infants and children and affects 70% of children at least once during their lifetime.<sup>1</sup>

Initially the infection starts with a viral upper respiratory infection. Within 24-48 hours, it is followed by bacterial infection.<sup>2</sup> This is mainly due to obstruction of eustachian tube that follows an upper respiratory tract infection. Besides nasal allergy, chronic rhinosinusitis, exposure to cigarette smoke, tumours of the nose and nasopharynx, cleft palate and breast feeding in supine position may contribute to the development of acute otitis media. These all directly or indirectly leads to the immobility of the cilia or edema of the eustachian tube leading to defect in ventilation and drainage of the middle ear cleft. The main organisms responsible are *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Moraxella catarrhalis*.<sup>3</sup>

The main symptoms included are earache, fever, fullness, decrease hearing and spontaneous aural discharge in association with nasal congestion or nasal discharge. The course of the disease depends on the virulence of the infecting organisms, the host immune response and inadequate treatment with antibiotics. Unless there is an evidence of discharge present for culture and sensitivity, investigations are not necessary. This shows simple and straightforward symptoms and signs that are helpful for

the diagnosis of acute otitis media even in the primary health care setup without expensive or sophisticated instruments.

There have been various recommendations concerning the treatment of acute otitis media and various guidelines have been published. Some withhold the use of antibiotics.<sup>4</sup> Evidence suggesting that routine use of antibiotics improves the course and outcomes of acute otitis media is weak.<sup>5</sup>

In country like ours, where antibiotics are available without prescription, higher antibiotics can be bought over the counter. Even some medical professionals prescribe higher antibiotics (2<sup>nd</sup>, 3<sup>rd</sup> generation cephalosporin, fluoroquinolones, macrolides etc.) for immediate relief or as a means of empirical treatment. This contributes to the rising prevalence of multidrug resistance of organisms mainly *Streptococcus pneumoniae*.

Antibiotic resistance has been declared a crisis by the World Health Organization, the Centers of Disease Control and Prevention.<sup>6</sup> Use of higher generation antibiotics unnecessarily in view of treating the disease early contributes to the antibiotic resistance.

The indiscriminate use of broad-spectrum antibiotics is associated with increasing bacterial resistance.<sup>7</sup> It has also come into view that excessive antibiotics in childhood have even been strongly associated with

subsequent obesity and inflammatory bowel disease later in life.<sup>8</sup>

## MATERIAL AND METHODS

This is a prospective longitudinal study. This study was carried out in the Department of ENT in two medical colleges and teaching hospitals for the duration of 15 months from Ashad 2069 to Bhadra 2070. Total number of patient diagnosed during this period was 204. History and complete ENT examination was done after taking consent from the patient. All patients were examined by the author and diagnosed to have suffered from acute otitis media when they presented with earache, fever, fullness and or otorrhea. On the basis of these symptoms and signs using a simple instrument like otoscope, diagnosis was made.

## INCLUSION CRITERIA

1. Recent onset of earache without previous episodes of similar illness within 6 months
2. Age more than 2 years
3. Patient who had not received any medications for the illness
4. Consent given

## EXCLUSION CRITERIA

5. Patients who had received antibiotics
6. Children aged less than 2 years
7. Patients with previous history of similar episodes within last 6 months
8. Consent not given

The patients were randomly selected into two equal groups on the basis of odd and even numbers and the treatments were commenced. Group A patients received only symptomatic treatment with analgesic and decongestant while Group B patients were also given Amoxicillin (40mg/kg/day) for the duration of 7 days.

Patients were followed up on the 3<sup>rd</sup> and 7<sup>th</sup> day. Treatment failure was said to have occurred when patient presented with severe earache and fever (temperature > 38°C) even after 72 hours of commencement of medications.

Investigating the patient in the acute phase is generally painful and unhelpful.

Statistical analysis was done with MS Excel and SPSS ver 17.0 software using Fisher's exact test. Significance level was assessed by calculating two tailed p value. P value was labeled significant if it was equal to or less than 0.05.

## RESULTS

Total number of patient suffering from acute otitis media was found to be 204. The patients were divided into two groups, Group A and Group B each consisting of 102 patients on the basis of treatment they received. It was found to be more common in children of 15 years and under (N=132, 64.7%) as shown in figure 1. Male (59%) were affected more than females (41%). 65.69% presented without perforation while 34.31% (N=70) presented with spontaneous discharging ear.

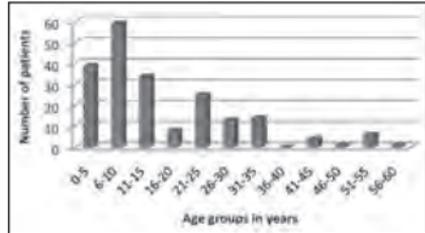


Figure 1. Age wise distribution

Figure 2 shows that most patients presented with unilateral earache (100%), aural fullness (90.68%, N=185), fever (76.47%, N=156) and aural discharge (34.31%) associated with recent onset of upper respiratory tract infections (88.23%, N=180). Diagnosis was based on red, hyperemic tympanic membrane (100%) with or without bulging and/or discharge on otoscopy.

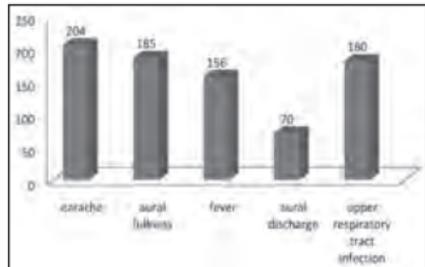


Figure 2. Presenting symptoms of Acute Otitis Media

Group A patient were treated only symptomatically without the use of antibiotics while group B patients were treated along with antibiotic (Amoxicillin:40mg/kg/day for children and 500 mg 8 hourly orally for adult for 7 days) upon diagnosis of acute otitis media.

As table 1 and 2 shows, in group A patients, improvement was noticed in only 28.43% (N=29) in 3 days while 35.29% (N=36) in 7 days. Similarly, in group B,

improvement was noticed in 48.03% (N=49) in day 3 while 86.27% (N=88) in day 7.

**Table-1:** Results at 3 days

	Group A	Group B	Total
Improved	29	49	78
Not improved	73	53	126
Total	102	102	204

p = 0.0060

**Table-2:** Results at 7 days

	Group A	Group B	Total
Improved	36	88	124
Not improved	66	14	80
Total	102	102	204

p = <0.0001

Of 70 patients with spontaneous perforation, 58 were of group A. Only 11.76% (N=12) had spontaneous perforation of tympanic membrane in group B. After spontaneous perforation of the tympanic membrane antibiotics were prescribed. Those not responding with adequate dose of amoxicillin until the 7<sup>th</sup> day, amoxicillin and clavulanic acid combination was given after which the patients improved. Not even a single patient had to undergo myringotomy in this study.

Number of patients improved with amoxicillin in the 3<sup>rd</sup> day compared to those with the symptomatically treated group was significant (p=0.006).

Moreover, significant improvement was seen within 7 days in patients who were prescribed with amoxicillin compared to those who were treated symptomatically. This was statistically significant (p=<0.0001).

No sequelae of the disease were noted. All tympanic membrane perforation healed within a month in both the groups. There was neither chronicity nor suppurative complications.

## DISCUSSION

Acute otitis media is a relatively common disease of the middle ear. It affects all age group but more commonly children. Among the 204 patients in this study, 132 patients were 15 years and below. There was slight male preponderance (M=59%, F=41%).

Patients who presented with earache, aural fullness, fever with or without ear discharge with history of preceding upper respiratory tract infection and congested, hyperemic tympanic membrane on otoscopy was found to suffer from acute otitis media unless proven otherwise.

The best predictor of acute otitis media in otoscopic appearances typically is fullness or bulging of the

tympanic membrane.<sup>9</sup>

The incidence of spontaneous eardrum perforation in acute otitis media varies from literature to literature. Ingvarsson<sup>10</sup> found it in 30% of patients whereas; Pukander<sup>11</sup> at the other extreme reported it to occur in 4.6% of the patients with acute otitis media. In our study, spontaneous perforation occurred in 34.31% patients more in the group that did not receive the antibiotic.

Acute otitis media may be managed with antibiotics and analgesics or with observation alone depending on the severity. Clinicians should re-evaluate a child whose symptoms have worsened or not responded to the initial antibiotic treatment within 48 to 72 hours and change the treatment if indicated.<sup>12</sup>

Patients were divided into 2 groups on the basis of the treatment they received. Group A was treated symptomatically with analgesics and decongestants while group B patients were also given amoxicillin for the duration of 7 days.

Only 29 patients (28.43%) in group A showed improvement in 3 days while 73 patients had no improvement. By 7<sup>th</sup> day only 36 patients (35.29%) improved. Furthermore, of 70 patients with spontaneous perforation, 58 were of group A. In group B, improvement with respect to pain, fever was noticed in 49 patients (48.03%) in day 3 while 88 (86.27%) patients showed complete resolution in day 7. In this group, only 11.76% (N=12) had spontaneous perforation of the tympanic membrane. Compared to the treatment received in this group, patient showed significant improvement at day 7 than at day 3.

Mygind et al<sup>13</sup> found decreased pain in the penicillin group compared with the placebo group on day 2 but no difference for duration of fever, otorrhea or effusion up to 3 months.

In a study by Howie and Ploussard<sup>14</sup>, all case patients receiving placebo were asymptomatic at early follow-up (2 to 7 days) but had more positive tympanocentesis cultures than those receiving antimicrobials.

Overall results, together with other earlier studies of acute otitis media, 3 days antimicrobial treatment appeared less effective than 7 days treatment. Various studies of acute otitis media and otitis media with effusion in which outcomes also were less favorable in younger than in older children, suggest that 3 days treatment will often prove inadequate for acute otitis media.<sup>15,16</sup> Amoxicillin is most effective against acute otitis media caused by *Streptococcus pneumoniae* and *Haemophilus influenzae*. In high risk children (less than two years of age, in day care or received antibiotics recently)

who are likely to have drug resistant Streptococcus pneumoniae (resulting from excessive antibiotic use) increasing the dose of amoxicillin to 80-90mg/kg/day increases the likelihood that drug concentration will exceed the MIC for more than 40 percent of the time. Failure to respond to amoxicillin suggests that the child is infected with beta-lactamase producing organisms and amoxicillin/clavulanate is the treatment of choice in this circumstances.<sup>17</sup>

This study concludes that patients with acute otitis media invariably presents with earache, aural fullness, fever, with or without ear discharge with history of preceding upper respiratory tract infection. Otoloscopic examination reveals hyperemic tympanic membrane with retraction or bulge. In developing country like ours, where medical attention and care is scarce and patients are often lost to follow up, the treatment initially should be started with simple broad spectrum antibiotics like amoxicillin in adequate dose and duration. Either inadequate dose or duration is the cause for treatment failure. Such a measure reduces chronicity, prevents early hearing impairments and prevents unforeseen complications as in pre-antibiotic era. The use of higher generation antibiotics should be condemned. Patients, parents should be educated about the care of ear, antibiotic resistance and tackle the problem from community level by stopping inappropriate use of antibiotics.

#### REFERENCES

- Daly KA, Giebink GS. Clinical epidemiology of otitis media. *Pediatr Infect Dis J* 2000; 19:S31-6.
- Heikkinen T. The role of respiratory viruses in otitis media. *Vaccine*. 2001; 19:S51-5.
- Celin SE, Bluestone CD, Stephenson J, et al. Bacteriology of acute otitis media. *JAMA* 1991; 266:2249-52.
- Cunningham AS. Antibiotics for otitis media: restraint, not routine. *Contemp Pediatr*. 1994; 11(3):17-30.
- SL Woolley, F Faem, DRK Smith. Acute otitis media in children- there are guidelines but are they followed? *J Laryngol Otol*. 2005; 119:524-8.
- CDC. Transatlantic Taskforce on Antimicrobial Resistance – TATFAR 2009, The EU-US Summit Declaration.
- Diekema DJ, Bruggemann AB, Doern GV. Antimicrobial drug use and changes in resistance in Streptococcus pneumoniae. *Emerg Infect Dis* 2000; 6:552-6.
- Blaser M, Bork P, Fraser C, Knight R, Wang J. The microbiome explained: Recent insights and future challenges. *Nat Rev Microbiol*. 2013; 11:213-7.
- Pelton SI. Otoloscopy for the diagnosis of otitis media. *Pediatr Infect Dis J* 1998; 17:540-3
- Ingvarsson L. Acute otalgia in children-findings and diagnosis. *Acta Paediatrica Scandinavica*. 1983; 71:705-10.
- Pukander J. Clinical features of acute otitis media among children. *Ada Otolaryngologica*. 1983; 95:117-22.
- Barclay L. Pediatric ear infection: updated AAP treatment guidelines. *Medscape Medical News*. February 25, 2013. Available at <http://www.medscape.com/viewarticle/779817>.
- Mygind N et al. Penicillin in acute otitis media: a double-blind, placebo-control trial. *Clin Otolaryngol*. 1981; 6:5-13. Howie VM, Ploussard JH. Effectiveness of erythromycin estolate, triple sulfonamide, ampicillin, erythromycin estolate-triple sulfonamide, and placebo in 280 patients with acute otitis media under 2 and one-half of age. *Clin Pediatr*. 1972; 11:205-14.
- Kaleida PHI, Casselbrant ML, Rockette HE, et al. Amoxicillin or myringotomy or both for acute otitis media. *Pediatrics*. 1991; 87:466-74.
- Hoberman A, Paradise JL, et al. Efficacy of amoxicillin/clavulanate for acute otitis media: relation to *Streptococcus pneumoniae* susceptibility. *Pediatr Infect Dis J*. 1996; 5:955-62.
- Craig WA, Andes D. Pharmacokinetics and pharmacodynamics of antibiotics in otitis media. *Pediatr Infect Dis J* 1996; 15:225-59.