

Study of Bacteriological Profile of Ear Discharge in ASOM Cases at a Tertiary Care Hospital

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Abstract

Introduction: Acute otitis media (AOM) is a common condition with a high morbidity and low mortality. Acute suppurative otitis media (ASOM) is termed as the rapid and short onset of signs and symptoms of inflammation in the middle ear. It generally affects younger age group, with signs: otalgia, otorrhoea, fever, etc. bacterial profile of ASOM is clinically very important for accurate treatment. **Material & Methods:** Present study was carried in Department of Microbiology during the period September 2006 to August 2008 at Government College and Hospital, Ambajogai. A total of 179 clinically diagnosed cases of otitis media were included in study in the present study. A pretested proforma was filled in each case noting particulars in each case. Patients with ear discharge from acute otitis media with or without complications were selected, indoor as well as outdoor patients with discharging ears, had not received treatment for at least seven days prior to taking the samples. **Results:** Of the 179 swabs of ASOM, 162 swabs were culture positive (90.50%). Aerobes were isolated from 146 swabs (81.56%). *Streptococcus pneumoniae* was commonest isolate, 28 (18.79%). Anaerobes were isolated from 4 swabs (2.23%). *Prevotella melaninogenica* was predominant isolate, 2 (50%). **Conclusions:** ASOM is a common ENT condition with high morbidity and in our study a total of 179 cases were recorded with features of ASOM. More than 90% of samples were culture positive which was comparable to results by other authors. Aerobes were isolated in more than 80% of cases and *Streptococcus pneumoniae* was being common organism.

Keywords: ASOM; Otitis Externa; Bacteriological Profile; Ear Discharge; Aerobes; Anaerobes.

Introduction

Discharge from the ear is one of the commonest symptoms of infections of the ear. Infection of the ear is categorized into otitis externa (infection of external ear) and otitis media (infection of middle ear), the most common cause being otitis media [1]. As external

and middle ear are exposed to outer environment and nasopharynx respectively, these sites are likely to be infected when the natural milieu is disturbed. Otitis externa is a generalized condition of the skin of the external auditory canal that is characterized by edema and erythema associated with itchy discomfort and usually an ear discharge [2]. Otitis Media comprises of the inflammation of the middle ear cleft. It can be

acute, subacute or chronic. 3 Acute Suppurative Otitis Media (ASOM): It is the commonest ear pathology in otorhinolaryngological practice, also the commonest pediatric otorhinolaryngological presentation.^{3,4}

Acute suppurative otitis media (ASOM) is termed as the rapid and short onset of signs and symptoms of inflammation in the middle ear. It generally affects younger age group, with signs: otalgia, otorrhoea, fever, etc. Common organisms responsible for it are: Streptococcus pneumoniae, Haemophilus influenzae, Branhamella catarrhalis, Streptococcus-Gp A, Staphylococcus aureus, etc [5].

Acute otitis media (AOM) is a common condition with a high morbidity and low mortality. In the United Kingdom, each year, about 30% of children aged under 3 years visit their general practitioner with AOM [6]. In United States, AOM accounts for 18% of ambulatory care visits per year among preschool children [7,8]. The overall prevalence of active and inactive chronic otitis media (COM) given by UK National Study is 4.1% [9].

Changing trends of drug sensitivity in recent years have been seen due to improved bacteriological techniques. Studies in 1980s of the bacteriology of acute otitis media (AOM), found that H. influenzae was the dominant pathogen representing 53% of the isolates (verses 19% for S. pneumoniae). In 1990s, studies documented a shift in the persistent AOM population to S. pneumoniae as the dominant pathogen, with penicillin nonsusceptible S. pneumoniae (PNSP) accounting for 31% to 70% of S. pneumoniae recovered from these cases [10].

Material Methods

Present study was carried in Department of Microbiology during the period September 2006 to August 2008 at Government College and Hospital, Ambajogai. A total of 179 clinically diagnosed cases of otitis media were included in study in the present study. A pretested pro-forma was filled in each case noting particulars in each case. Criteria for selection: 1) Patients with ear discharge from acute otitis media with or without complications were selected. 2) Indoor as well as outdoor patients with discharging ears were taken from the Department of E.N.T. 3) Patients had not received treatment for at least seven days prior to taking the samples.

Results

The Table 1 shows the prevalence of organisms in present study. Out of the 179 samples of ASOM, the aerobes are isolated from 146 samples (81.56%) and anaerobes from 4 samples (2.23%). No growth is seen in 19 samples. Of the 402 samples of CSOM, the total aerobic samples are 282 (70.15%) and anaerobic samples are 296 (73.63%). 3 samples show no growth.

The Table 2 shows the distribution of bacteria in ASOM: Aerobes are isolated from 146 samples (81.56%) of the total samples and anaerobes are isolated from 4 samples (2.23%). There are no samples showing mixed growth.

Table 1: Prevalence of aerobic and anaerobic microorganisms in ASOM

| Distribution | ASOM |
|-----------------|------|
| Samples | 179 |
| Total aerobes | 146 |
| Total anaerobes | 4 |

Table 2: Prevalence of monomicrobial and polymicrobial organisms isolated in ASOM

| Organisms | Nature | Samples | Strains |
|-----------|---------------------------|------------|------------|
| Aerobes | Monomicrobial | 143 | 143 |
| | Polymicrobial: 2 isolates | 3 | 6 |
| | Total | 146 | 149 |
| Anaerobes | Monomicrobial | 4 | 4 |
| | Polymicrobial | - | - |
| | Total | 4 | 4 |
| | Total | 150 | 153 |

Table 3: Distribution of aerobes isolated in ASOM**A. Monomicrobial isolates in ASOM:**

| Sr. No | Organisms Isolated | Isolates | % (N=143) |
|--------|----------------------------|------------|-----------|
| 1. | Streptococcus pneumoniae | 27 | 18.88% |
| 2. | Staphylococcus aureus | 24 | 16.78% |
| 3. | Streptococcus pyogenes | 17 | 11.89% |
| 4. | Escherichia coli | 12 | 8.39% |
| 5. | Klebsiella species | 12 | 8.39% |
| 6. | Pseudomonas aeruginosa | 12 | 8.39% |
| 7. | Proteus vulgaris | 11 | 7.69% |
| 8. | Streptococcus viridians | 10 | 6.99% |
| 9. | Proteus mirabilis | 9 | 6.29% |
| 10. | Staphylococcus epidermidis | 8 | 5.59% |
| 11. | Diphtheroids | 1 | 0.69% |
| | Total | 143 | |

B. Aerobic polymicrobial organisms in ASOM : 2 organisms

| Sr. No. | Organisms | Samples | Strains |
|---------|--|----------|----------|
| 1. | Streptococcus pyogenes +Staphylococcus aureus | 2 | 4 |
| 2. | Streptococcus pneumoniae +Pseudomonas aeruginosa | 1 | 2 |
| | Total | 3 | 6 |

Table 4: Anaerobes in ASOM

| Sr. No. | Anaerobe | Samples | Strains |
|---------|---------------------------|----------|----------|
| 1. | Prevotella melaninogenica | 2 | 2 |
| 2. | Peptostreptococcus magnus | 1 | 1 |
| 3. | Propionibacterium acnes | 1 | 1 |
| | Total | 4 | 4 |

Out of 146 samples of aerobes, 143 samples have isolated single organism 143(97.95%) strains and 3 samples have isolated 2 types of organisms, 6 (2.05%) strains. All the 4 anaerobic samples show single organism.

Of the 146 samples of aerobes, 143 samples are monomicrobial (97.94%). Commonest organism is Streptococcus pneumoniae, isolated in 18.88% of isolates. The polymicrobial organisms are recovered from 3 samples (2.05%) of the total aerobic samples. Streptococcus pyogenes +Staphylococcus aureus is isolated from 2 samples out of the 3 polymicrobial samples.

Anaerobes are isolated from 4 samples (2.23%) and they are all monomicrobial organisms.

Prevotella melaninogenica is the commonest, isolated in 50% of the anaerobic samples of ASOM, followed by Peptostreptococcus magnus, and Propionibacterium acnes, isolated in 1 sample each. The findings from above table suggests that anaerobic organisms though rare, are still present in acute cases of otitis media.

Discussion

Monomicrobial and polymicrobial distribution of aerobes and anaerobes in ASOM:

ASOM Aerobes: In ASOM, aerobes are present in 146 (81.56%) of the total samples and anaerobes in 4(2.23%)of the samples. There are no samples showing mixed growth. This is consistent with Celin et al [11] (82%), Zeilnik et al [12] (63.9%), Jokipii et al [13] (69.98%).

Polymicrobial Isolation in ASOM: Out of 146 samples of aerobes, 143 (97.94%) are monomicrobial and 3(2.05%) are polymicrobial containing 2 different organisms, this is in accordance with Shurin et al [14] (4.25%), Celin et al [11] (5.88%). Friedman (1957) [15] isolated polymicrobials in 11.7% cases which is higher than present study. Kikuta et al(2007) [16], in their study on ASOM cases predicted that lower age and presence of multiple bacteria.

ASOM Anaerobes: In present study, only 4 monomicrobial anaerobes are recovered (2.23%) and show no polymicrobials.

Anaerobes have a limited role in acute otitis media. Celin et al [11] (1991) isolated anaerobes in 5% .

Distribution of Organisms in ASOM

Aerobes: 149 strains of aerobes are isolated from

146 samples. Streptococcus pneumoniae is the most common organism found in 18.79% of isolates. Celin et al [11] (21%), Kilpi et al [17] (26%), Fairbanks et al [18] (25%), Zeilnik et al [12] (40.4%), present study is in accordance with above studies. S.pneumoniae is one of the commonest organism of ASOM.

Comparison of Commonest Organisms of ASOM

| Author | S.pneumoniae | S.pyogenes | S.aureus |
|---------------------------------|--------------|------------|----------|
| Friedman et al ¹⁵ | 4.2% | 27.4% | 41.8% |
| Baruah et al ¹⁸ | 2.91% | 0.97% | 33.98% |
| Shurin et al ¹⁴ | 12.85% | 2.85% | 4.28% |
| Sriwardhana et al ²⁰ | 2.7% | 0.4% | 2.7% |
| Celin et al ¹¹ | 21% | 3% | 3% |
| Zeilnik et al ¹² | 40% | - | 14% |
| Present study | 18.79% | 12.75% | 17.45% |

Comparison of Bacteria in Different Studies in ASOM

| Organism | Friedman et al ¹⁵ | Baruah et al ¹⁹ | Shurin et al ¹⁴ | Present Study |
|----------------------------|------------------------------|----------------------------|----------------------------|---------------|
| Streptococcus viridans | 27.4% | 7.69% | 1.43% | 6.99% |
| Streptococcus pyogenes | 6.43% | 0.00% | 2.85% | 12.75% |
| E.coli | 4.2% | 0.00% | 1.43% | 8.39% |
| Pseudomonas aeruginosa | 5.5% | 15.38% | 1.43% | 8.72% |
| Klebsiella pneumoniae | 0.00% | 38.40% | 1.43% | 8.39% |
| Staphylococcus epidermidis | 0.00% | 23.08% | - | 5.59% |
| Diphtheroids | 0.00% | 0.00% | - | 0.69% |

Comparison of Commonest Organisms of ASOM

Lower percentage of Streptococcus pneumoniae than ours was seen by Freidman et al [15] (1957), Baruah et al [19] (1972) and Sriwardhan et al [20] (1989).

Other organisms in present study are Pseudomonas aeruginosa (8.72%), E.coli (8.39%), Klebsiella species (8.39%), Proteus vulgaris (7.69%), Streptococcus viridians (6.99%), Proteus mirabilis (6.29%), Staphylococcus epidermidis (5.59%) and Diphtheroids(0.69%). Gram negative bacteria are responsible for 20% cases of otitis media in young infants [4].

Anaerobes: Out of the 179 swabs of ASOM, anaerobes are isolated in 2.23% of samples. Our study shows Prevotella melaninogenica 2 strains, Peptostreptococcus magnus and Propionibacterium acnes,1 strain each.

Brook (1987) [21] isolated anaerobes, mainly Prevotella melaninogenica and gram negative cocci. Celin(1991) [11] isolated 2 strains of Propionibacterium acnes in his study. Propionibacterium acnes could be considered as a component of the skin flora of the external auditory canal and is rarely a pathogen. Confirmation is done by reisolation of this organism from the same patient.

Conclusions

ASOM is a common ENT condition with high morbidity and in our study a total of 179 cases were recorded with features of ASOM. More than 90% of samples were culture positive which was comparable to results by other authors. Aerobes were isolated in more than 80% of cases and Streptococcus pneumoniae was being comment organism.

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