



BACTERIOLOGY AND ANTIBIOTIC SENSITIVITY OF EAR DISCHARGE IN A TERTIARY CARE CENTRE IN NORTHERN INDIA

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Dr Anjan kumar Sahoo*

Assistant Professor, Department of ENT, Maulana Azad Medical College, New Delhi
*Corresponding Author

Dr Karandeep Singh

Junior Resident, Department of ENT, Maulana Azad Medical College, New Delhi

ABSTRACT

Introduction: Otitis media (OM) is a leading infection and a major health problem in developing countries such as India. Subsequently if unattended it causes serious local damage and life threatening complications. Early and effective treatment based on the knowledge of causative micro-organisms and their antimicrobial sensitivity ensures prompt clinical recovery and possible complications can thus be avoided. **Aims:** The aim of this study was to isolate the common organisms associated with OM and also to detect the drug sensitivity of the organisms. **Materials and methods:** A total of 110 patients clinically diagnosed of OM were inducted in the study and the pus samples were obtained from each patient using sterile cotton swabs. **Results** Female(59%) outnumbered males in our study. *Pseudomonas aeruginosa*(35%) and *Staphylococcus aureus* (27%) were the most common causative bacteria identified. *Pseudomonas* showed maximum sensitivity to Piperacillin, Linezolid and Ciprofloxacin. **Conclusion:** OM is predominantly a disease of childhood and young adults. Maximum number of cultures obtained are monomicrobial and mixed infections are comparatively less common. The cause and pathogenesis of otitis media is multifactorial *Pseudomonas aeruginosa* and *staphylococcus aureus* were the most common organism isolated. Proper and appropriate use of antibiotics will reduce the chance of antibiotic resistance and also will reduce the cost of treatment.

KEYWORDS

Otitis media; ear discharge; antibiotic sensitivity

INTRODUCTION

Otitis media (OM) is one of the common causes of childhood illnesses though it can also affect the adults. OM is a major public and social concern, especially in developed countries. It is broadly divided into Acute otitis media (AOM) and chronic otitis media (COM). The cause and pathogenesis of otitis media is multifactorial. Out of these, the single most important are bacterial and viral infections¹. Common viruses that are associated with otitis media are respiratory syncytial virus, enteroviruses, adenovirus/influenza viruses and para-influenza viruses. AOM is also one of the most common indications leading to antibiotic prescription in young children². On an average around 65–330 million people are suffering from OM worldwide, and among them around 60% suffer from measurable hearing loss³. Most of the OM are benign but in some circumstances it may lead to some serious complications like meningitis, sepsis, brain abscess and permanent hearing impairment⁴.

This study was executed to evaluate the common microorganisms involved in causing OM and also their antibiotic sensitivity.

Materials and Method:

This was a retrospective study where the record of patients who underwent ear swab test in the period from July 2019 to December 2019 were reviewed. Hundred and ten swabs taken from the out patient departments were included in the study. The patients with ear discharge due to any cause other than OM like otomycosis, trauma, furuncle and foreign body ear were excluded from the study. The specimens were sent for culture and sensitivity. All the specimens were tested for following antimicrobial: ampicillin, oxacillin, gentamicin, ciprofloxacin, clindamycin, erythromycin, trimethoprim, cefazolin, amoxicillin & clavulanic acid, piperacillin, Linezolid and colistin.

Results:

As per table-1 majority of the patients were of less than 15 years of age (35%), and there is a decreasing trend till 60 years of age followed by sudden increase in cases after 60 years of age.

Age Distribution of Patients (Table-1)

Age Group	Number of Patients (%)
Less than 15 years	38(35)
16 - 30 years	22(20)
31 - 45 year	14(13)
46- 60 years	17(15)
More than 60 years	19(17)
Total	110(100)

Female(59%) outnumbered males in our study (Table-2)

Sex Distribution of Patients: (Table-2)

Sex	Number of Patients (%)
Male	45 (41)
Female	65 (59)
Total	110 (100)

Pseudomonas aeruginosa(35%) and *Staphylococcus aureus* (27%) were the most common causative bacteria identified. Mixed bacteria growth was isolated in 11% cases. Other bacteria like *klebsiella*, *escherichia coli* species, *proteus* and *haemophilus influenza* species were constituted the rest of the isolates (Table-3).

Organism Isolated from the Culture Specimen (Table 3)

Name of Microbials	Total number of Sample (%)
<i>Pseudomonas aeruginosa</i>	37(35)
<i>Staphylococcus aureus</i>	29(27)
<i>Klebsiella</i>	7(6)
<i>Escherichia coli</i> species	7(6)
<i>Enterobacter</i> species	6(5)
<i>Proteus</i> species	5(4.2)
<i>Haemophilus influenza</i>	3(2.8)
Skin flora	4(3)
Mixed bacterial growth	12(11)
Total	110 (100)

Pseudomonas showed maximum sensitivity to Piperacillin, Linezolid and Ciprofloxacin. It showed maximum resistance to amoxycillin and clavulanic acid. *Staphylococcus aureus* showed maximum sensitivity to gentamicin, colistin and ampicillin. It showed maximum resistant to oxacillin (Table-4).

Antibiotic Sensitivity Of Common Pathogens (Table-4)

	P.aureus		S. aureus		Klebsiella		E.coli	
	S	R	S	R	Sp		S	R
Ampicillin	-	-	10	4	3	2	-	-
Oxacillin	-	-	6	11	-	-	-	-
Gentamicin	-	-	12	4	2	2	3	1
Ciprofloxacin	16	5					5	2
Clindamycin	-	-	-	-	4	-	-	-
Erythromycin	-	-	-	-	-	-	-	-
Trimethoprim	-	-	4	8	-	-	2	1

Cefazolin	-	-	7	5	-	-	-	-
Amoxicillin & clavulanic acid	4	14	5	7	-	-	3	1
Piperacillin	5	4	-	-	4	1	-	-
Linezolid and Colistin	18	3	8	3	-	-	-	-
	17	4	11	2	-	-	-	-
	14	7			2	1	-	-
					-	-		

DISCUSSION:

Ear discharge is one of the cardinal and disturbing symptoms of ear infection among all age groups. Chronic otitis media (COM) is chronic inflammation of middle ear affecting the tympanic membrane, middle ear mucosa and other middle ear structures characterised by the presence of persistent perforation and mucoid or mucopurulent discharge for at least 8 weeks. Correct identification of the causative microorganism and antibiotic susceptibility will enhance the treatment outcome and at the same time reduce the unnecessarily use of so many antibiotics. In our study, the majority of patients were less than 15 years of age. This is because children and young adults are more exposed to crowded places like schools, day care centers and also because of frequent upper respiratory tract infections^{5,6}. In our study females(59%) outnumbered the males(41%) which are also in accordance with other study⁷ in the literature but the exact reason is still not known. But in lots of other study male outnumbered the females^{8,9}. *Pseudomonas Auregenosa* was the most common isolated bacteria followed by *staphylococcus aureus*. *Pseudomonas aeruginosa* and *Staphylococcus aureus* are most commonly reported organisms. *Pseudomonas aeruginosa* is the predominant organism because it is infrequently found in the normal ear. It is ubiquitous and has a predilection for moist areas. It is most common nosocomial infection¹⁰. Other less common bacterias like *proteus* species, *haemophilus influenza*, *escherichia coli* are also identified. Very unusual organisms such as *Mycobacterium tuberculosis*, *M. chelonae*, *M. avium* complex, *Actinomyces* species, and *Candida* species are also reported in literature¹¹.

The *Pseudomonas aeruginosa* isolated Otitis Media specimens in our study were sensitive to Piperacillin, Linezolid, Colistin and ciprofloxacin; and resistant to amoxycylavulnic acid. In this study they found that *Pseudomonas* was sensitive to Ciprofloxacin, Amikacin, Cefoparazone¹². *S. aureus* were sensitive to Ampicillin,, Gentamicin and Colistin; and resistant to amoxycylavulnic acid and oxacillin. But study by Kumar et al¹³ had the view that *S. aureus* was sensitive to Amikacin and Linezolid; and resistant to Piperacillin. *Klebsiella* and *E. coli* species were sensitive to ciprofloxacin and amoxycylavulnic acid and resistant to clindamycin and erythromycin.

CONCLUSION

Otitis media is more common in females than males. The common organisms identified were *pseudomonas aeruginosa* and *staphylococcus aureus*. Ciprofloxacin, piperacillin, Linezolid and colistin were the common sensitive antibiotics against *pseudomonas aeruginosa*. *Staphylococcus aureus* was found sensitive to amikacin and linezolid. In this study we are emphasized that proper and appropriate use of antibiotics will reduce the chance of antibiotic resistance and also will reduce the cost of treatment.

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