

# Prevalence of Micro-Organisms Isolated from Ear Swab

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**Abstract:** Introduction: Discharge from ear is one of the commonest symptoms of infection of the ear. To screen various pathogenic organisms isolated from the ear swab and to determine their antibiotic sensitivity pattern against the commonly used antibiotics. Materials and Methods: Ear swabs were collected from different patients and subjected to sensitivity test was performed. Result: A total 400 specimens were collected from different patients in which 230 specimens showed positive growth and 170 specimens showed no growth. Conclusions: This study demonstrated that *Staphylococcus aureus* and *Pseudomonas aeruginosa* is the commonest organisms, isolated from ear swab which causes of ear discharge. Ciprofloxacin and gentamycin are effective ototoxic antimicrobial agents for empirical treatment of the discharge ear.

**Keywords:** Ear discharge , Antimicrobial drugs , antibiotics sensitivity pattern

## 1. Introduction

Ear infection is an inflammation of the ear and ear discharge is one of the commonest symptoms of ear infection [1]. About 65-330 million people suffer from ear infection worldwide and 60% of them had significant hearing impairment [2]. The health-economic burden of ear infection is also severe especially in Africa and other developing nations where the disease prevalence is estimated as high as 11% [3].

Ear infection is a common problem for both children and adults but the magnitude is different in different countries. Anatomically the children's Eustachian tube is shorter, more horizontal with a more flaccid cartilage which can easily impair its opening and hence ear infection is a major health problem of them especially in those with poor socioeconomic status [4].

Otitis media, an infection of the middle ear, is usually associated with upper respiratory tract infection. Although, it can occur at any age, but 60-80% of children infected with recurrent otitis media [6]. Early diagnosis may avoid the possibility of complications associated with such infection like, brain abscess, meningitis, lateral sinus thrombosis and subdural abscess [7]. The infection was attributed to many bacterial species like *Staphylococcus aureus*, *Proteus mirabilis*, *Proteus vulgaris*, and *Pseudomonas aeruginosa* [8,9].

Chronic suppurative otitis media (CSOM) is a prevailing and notorious infection in developing countries causing serious local damage and threatening complications. It is characterized by painless discharge from ears dating from months to years and is the single major cause of deafness in India. It is common amongst children of low socio economic strata [5].

## 2. Materials and Methods

The study conducted on 230 isolates that obtained from ear swab submitted to the department of microbiology from

December 2015 to February 2016, were included in the study. The swabs were inoculated on the Mac Conkey agar and Blood agar , these plates were incubated aerobically at 37°C for 24 to 48 hours .All plates which showed growth were processed as per standard microbiological procedures. Antibiotic sensitivity testing was done by Kirby Bauer disk diffusion method using Mueller-Hinton agar. [10]

## 3. Result

A total of 400 samples were included in the study, out of which 230 showed positive bacterial growth and 170 were negative for any bacterial growth.

Out of 230 isolates , 80 *Staphylococcus aureus* , 10 *Enterococcus species* , 10 *E. coli* , 10 *Klebsiella pneumoniae*, 70 *Pseudomonas aeruginosa*, 20 *Citrobacter species*, 30 *Proteus spp.* *Staphylococcus aureus* and *Pseudomonas aeruginosa* showed maximum growth followed by other organisms .

Antibiotic sensitivity test of all the clinical isolates was performed as per CLSI (2015) and sensitivity pattern was noted.

**Table 1:** Total number of isolates in the ear swab culture

Organisms	Number of Isolates
<i>Staphylococcus aureus</i>	80 (34.7%)
<i>Enterococcus species</i>	10 (4.3%)
<i>E. coli</i>	10 (4.3%)
<i>Klebsiella pneumoniae</i>	10 (4.3%)
<i>Pseudomonas aeruginosa</i>	70 (30.4%)
<i>Citrobacter species</i>	20 (8.6%)
<i>Proteus mirabilis</i>	30 (13%)
TOTAL	230

**Table 2:** Antibiotic sensitivity pattern of gram positive isolates

Antibiotics	ORGANISMS (n=90)			
	<i>Staphylococcus aureus</i> (n=80)		<i>Enterococcus spp.</i> (n=10)	
	S	R	S	R
Amikacin	70	10	6	4
Clindamycin	-	-	5	5
Doxycycline	60	20	7	3
Levofloxacin	50	30	3	7
Chloramphenicol	40	40	8	2
Cefoxitin	40	40	6	4
Gatifloxacin	50	30	3	7
Ofloxacin	60	20	3	7
Ciprofloxacin	50	30	6	4
Gentamycin	60	20	8	2
Pristanamycin	40	40	8	2
Tobramycin	70	10	9	1
Netilmycin	60	20	4	6
Erythromycin	50	30	6	4
Penicillin	60	20	3	7
Co-Trimoxazole	-	-	4	6
Ampicillin	38	42	4	6
High strength Streptomycin	-	-	1	9
High strength Gentamycin	-	-	5	5
Vancomycin	-	-	4	6

S= sensitive  
 R= resistant  
 n=number of organisms

**Table 3:** Antibiotic sensitivity pattern of gram negative isolates

Antibiotics	ORGANISMS (n=140)									
	<i>Escherichia coli</i> (n=10)		<i>Pseudomonas aeruginosa</i> (n=70)		<i>Klebsiella species.</i> (n=10)		<i>Citrobacter species</i> (n=20)		<i>Proteus spp.</i> (n=30)	
	S	R	S	R	S	R	S	R	S	R
Amikacin	8	2	32	38	7	3	4	16	30	0
Fosfomycin	8	2	-	-	2	8	8	12	28	2
Doxycycline	4	6	-	-	10	0	7	13	30	0
Levofloxacin	6	4	45	25	5	5	8	12	24	6
Cefoxitin	6	4	-	-	6	4	15	5	22	8
Ofloxacin	8	2	-	-	5	5	15	5	-	-
Ciprofloxacin	10	-	-	-	2	8	10	10	5	25
Gentamycin	8	2	58	12	4	6	10	10	21	9
Pristanamycin	-	-	24	46	-	-	-	-	-	-
Co-Trimoxazole	2	8	-	-	3	7	10	10	2	28
Ampicillin	7	3	-	-	4	6	10	10	10	20
Cefotaxime	7	3	-	-	6	4	16	4	18	12
Ceftazidime	9	1	-	-	1	9	14	6	22	8
Ceftriaxone	7	3	-	-	3	7	12	8	-	-
Cefepime	2	8	66	4	2	8	13	7	14	16
Cefaclor	4	6	-	-	4	6	16	4	15	15
Cefixime	3	7	-	-	5	5	14	6	-	-
Cefuroxime	7	3	-	-	5	5	-	-	5	15
Cefazolin	8	2	-	-	6	4	12	8	13	17
Piperacillin	-	-	47	23	-	-	-	-	-	-
Piperacillin-Tazobactam	-	-	65	5	-	-	-	-	-	-
Aztreonam	-	-	53	17	-	-	-	-	-	-
Colistin	-	-	26	44	-	-	-	-	-	-

S= sensitive  
 R= resistant  
 n=number of organisms

#### 4. Discussion

Ear discharge is one of the most frequently ordered samples for microbiological analysis in the study area. This indicates that ear infection is a common problem in the given area. In the present study, 400 specimens were included in the study, out of which 230 (67.5%) showed positive bacterial growth and 170 were negative for any bacterial growth. Out of 90(39.1%) isolates of Gram positive and 140 (60.8%) were gram negative, which is compare to another previous study.[11,12,13]

In our study, commonest organisms isolated are *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Proteus spp.*. Less common organisms are *E. coli* and *Klebsiella species*. In this study *Pseudomonas aeruginosa* and *Staphylococcus aureus* were the most predominant organism being isolated in 70(30.4%) and 80 (34.7%) of the cases. This was followed by *E. coli* in (4.3%) cases. *Proteus* (13%) and *Klebsiella* (4.3%), *Citrobacter spp.* (8.6%) and *Enterococcus spp.* (4.3%). These findings were similar to those of similar studies.[15,16]

#### 5. Conclusion

*Pseudomonas aeruginosa* and *Staphylococcus aureus* were the most common bacteria isolated from chronic discharging ears. Ciprofloxacin and gentamycin found to be the most sensitive against *pseudomonas aeruginosa* and *Staphylococcus aureus*. Development of resistance to commonly used antibiotics for treating *Pseudomonas aeruginosa* and *Staphylococcus aureus* infections in otitis media, alert us against indiscriminate usage of antibiotics to prevent development of resistance.

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