

A Bacteriological Study of Ear Discharge

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Abstract:

Discharge from the ear is one of the commonest symptoms of infections of the ear. With a view to study the major strains of bacteria encountered in ear discharges, this study was conducted in our ENT department. The aim of the study was to identify the organisms commonly found in Ear discharge and their sensitivity to Antibiotic. Every day around 60 patients were treated in department of ENT, in our hospital; out of which 30-40 patients had chief complaints of ear discharge. 34,800 patients were attended ENT outpatient department of which 5800 belong to ear diseases. Out of 5800 patients, 100 patients were selected by random basis from October 2007 to October 2009. Patients who have taken antibiotic therapy, local or systemic within 2 weeks before presenting to the department were excluded from this study. Out of 100 cases, Pseudomonas aeruginosa is isolated in 42 cases (42.86%), Staphylococcus aureus in 38 cases (38.77%), Proteus species in 8 cases (8.16%), Escherichia coli in 6 cases (6.12%), Klebsiella in 5 cases (5.1%), Enterobacter, Pneumococci & Atypical coliforms in 1 case each.

Key Words : ear discharge, pseudomonas, sensitivity,

INTRODUCTION:

Middle ear infection is the commonest site for infection in ear. The tympanic membrane infection usually spreads to it from the pharynx

and the nose through eustachian tube. Day to day most of the microbial flora is changing its pathogenic nature and developing resistance to common drugs. Patients with aural discharge have

educational and social problems. Hence we selected patients with aural discharge of all age groups to find out present common pathogenic organisms and their drug sensitivity in ear to make it safe, dry and serviceable. Moragagni (1682 – 1771) First recognised that the ear infection gives brain abscess. Robert Koch¹ (1843-1910 – father of medical microbiology) studied culture & characteristic of bacteria, introduced staining technique & culture method as solid media. Till Domagk (1935)² discovered first chemotherapeutic drug prontosil (Sulfonamide). But Fleming's discovery of penicillin was the beginning of the antibiotic era. The aim of the present study is To identify the organisms commonly found in Ear discharge and their sensitivity to Antibiotics.

MATERIALS AND METHODS:

Hundred patients were selected by random basis at our hospital in out patient department from October 2007 to October 2009.

Inclusion criteria:

1. Patients presenting with mucoid/mucopurulent/purulent ear discharge either unilateral or bilateral

Exclusion criteria:

1. Patients who have taken antibiotic therapy, local or systemic within 2 weeks before presenting to the department.

Procedure for culture sensitivity includes the following

1. Specimen collection & transport:

Sterile cotton swab containing bottle is obtained from microbiology department

just before collection. The outer contaminated discharge is cleaned with sterile cotton. Discharge from deep area near tympanic membrane is taken on to the sterile swab, under bulleye lamp illumination. This specimen containing swab is kept immediately in sterile bottles & sealed with cap & it is properly labelled (Name, Age, Sex, O.P number, Site of the specimen) & sent to microbiology department.

2. Smear, Staining & culture :

From the specimen, smear is made on a glass slide & stained with Gram stain for preliminary identification of pathogenic flora. If pathogenic organisms are present in the stained specimen, the same swab is inoculated in a suitable culture media (Blood agar, Nutrient agar, Mac Conkey's agar) for 24 hrs at 37° C for growth characteristics of microorganisms. Next day, the morphology of growth studied & pathogenic organisms confirmed by gram stain & biochemical reactions.

3. Antibiotic sensitivity testing:

For antibiotic sensitivity, the bacterial growth suspension is flooded on the surface of plate containing culture media Mueller Hinton agar (MHA) & the excess is pipette off. After the plate is dried, antibiotics (about 6 – 7 in a 9 cms plate) which are commercially available in 6 mm discs are kept at minimum distance of 24 mm from each other. After overnight

incubation the inhibition zone is measured and compared against standard guidelines. It is reported as sensitive or resistant.

OBERVATIONS & RESULTS:

Total number of out patients who attended ENT out patient department were 34,800 during the

study period from October 2007 – September 2009. Patients presented with ear diseases were 5800 (16.66%) . Out of 5800 patients, 100 cases were selected based on study design. Single organism is isolated in 94 cases, 2 organisms are isolated in 4 cases, no pathogenic organisms are isolated in 2 cases shown in Table -1.

Table 1

Isolates	No. Of cases	Percentage
Single	94	94%
Double	4	4%
sterile	2	2%

Out of 100 cases, Pseudomonas aeruginosa is isolated in 42 cases, Staphylococcus aureus in 38 cases, Proteus species in 8 cases, Escherichia.coli

in 6 cases, Klebsiella in 5 cases, Enterobacter, Pneumococci & Atypical coliforms in 1 case each shown in Table-2.

Table 2 – Organisms isolated

	Organism isolated	No. Of cases	Percentage
1	Pseudomonas aeruginosa	42	42.86%
2	Staphylococcus aureus	38	38.77%
3	Proteus species	08	8.16%
4	Escherichia.coli	06	6.12%
5	Klebsiella species	05	5.1%
6	Enterobacter	01	1.02%
7	Pneumococci	01	1.02%
8	Atypical coliforms	01	1.02%

Out of 100 cases, ASOM is seen 17 cases, out of which 12 cases affected right ear & 5 cases affected left ear. CSOM was seen in remaining 83

cases, out of which 37 cases affected right ear, 32 cases affected left ear & bilateral ears were affected in 14 cases shown in Table-3.

Table 3 - Table showing the ear affected

Total	ASOM			CSOM		
	Right	Left	Bilateral	Right	Left	Bilateral
100 cases	12	5	0	37	32	14

Out of 83 cases of CSOM, Pseudomonas aeruginosa is isolated in 40 cases, Staphylococcus aureus in 26 cases, Proteus species in 6 cases, Esch.coli in 6 cases, Klebsiella species in 4 cases,

Enterobacter, Pneumococci & Atypical coliforms in one case each. No pathogenic organism is seen in one case shown in Table-4.

Table – 4

Organisms isolated in cases of CSOM

	Organism isolated	No of cases	percentage
1	Pseudomonas aeruginosa	40	48.19
2	Staphylococcus aureus	26	31.32
3	Proteus species	6	7.23
4	Escherichia.coli	6	7.23
5	Klebsiella species	4	4.82
6	Enterobacter	1	1.20
7	Pneumococci	1	1.20
8	Atypical coliforms	1	1.20
9	Sterile	1	1.20

Out of 17 cases of ASOM, Staphylococcus aureus is isolated in 12 cases, Pseudomonas aeruginosa & Proteus species in 2 cases each, Klebsiella species

in one case & no pathogenic organism was seen in one case shown in Table-5.

Table – 5

Organisms isolated in cases of ASOM

Sl.no	Organism isolated	No of cases	Percentage
1	Staphylococcus aureus	12	70.58
2	Pseudomonas aeruginosa	2	11.76
3	Proteus species	2	11.76
4	Klebsiella species	1	5.88
5	Sterile	1	5.88

Micro-organisms isolated & their drug sensitivity shown in Table-6

Table – 6

Sl. no	Organism isolated (No. of cases)	Drug sensitivity	No. Of cases	%
1	Pseudomonas aeruginosa (42)	1. Carbenicillin 2. Imipenum 3. Piperacillin	38 36 31	90.47 85.71 73.80
2	Staphylococcus aureus (38)	1. Cefuroxime 2. Cephataxime 3. Amoxyclav	34 32 27	89.47 84.21 71.05
3	Proteus species (8)	1. Gentamycin 2. Cephataxime 3. Ceftriaxone & Cefuroxime	7 6 5	87.5 75 62.5
4	Klebsiella species (5)	1.Imipenem 2. Sparfloxacin 3.Ciprofloxacin & Gentamycin	4 4 3	80 80 60
5	Escherichia.coli(6)	1.Amoxyclav 2.Cefuroxime 3.Ceftriaxone	6 6 4	100 100 66.6
6	Enterobacter(1)	1.Imipenem		

		2.Gentamycin 3.Sparfloxacin		
7	Pneumococci(1)	1.Cefuroxime 2.Ceftriaxone 3.Chloramphenicol		
8	Atypical coliforms(1)	1.Amikacin 2.Ofloxacin 3.Gentamycin		

DISCUSSION:

Ear discharge is the commonest complaint with which patients come to ENT clinics in every day practice. The commonest cause for ear discharge is Acute suppurative otitis media (ASOM) & Chronic suppurative otitis media(CSOM). This infection is initiated by Eustachian tube obstruction which may be caused by adenoids & infections in nose & paranasal sinuses. They can prove to be primary foci for intracranial disease.

In the present study out of 100 cases of ear discharge, the highest incidence was observed in the age group, 11 – 30 years(53%). Analysis of sex incidence in this present study revealed that ear discharge is more common in males(53%) than females(47%). As this study involved random selection of cases, the prevalence of male patients over female patients may be only an incidental finding.

Many studies were done regarding bacteriological study of CSOM & ASOM, so the results of this study is been compared with those studies. Earlier published reports indicate that CSOM may be unilateral or bilateral. In the present study, unilateral infection was predominant (83%). Right ear – 53.6%, left ear – 46.3%, bilateral ears –

16.9%. These findings correspond with Lakshmipathi & Bhaskaran³ study in 1965 who reported a predominant unilateral presentation, 91 out of 118 cases.

Out of 83 cases of CSOM, Pseudomonas aeruginosa is the most predominant organism isolated in 40 patients contributing to 48.19%, it is followed in order of frequency by staphylococcus aureus – 26 cases(31.3%), Proteus species 6 cases(7.22%), Escherichia coli 6 cases(7.22%), Klebsiella – 4 cases(4.81%), Enterobacter, Pneumococci, Atypical coliforms 1 case each(1.2%). The similar finding with Pseudomonas aeruginosa as predominant organism was reported by Gulati et.al in 1969⁴, Sharma S et al 2004⁵, A H C Loy et al 2002⁶

In this study staphylococcus aureus was predominant organism in ASOM (70%), similar finding was observed with Isch, K.R & Adegbite.T⁷with 46.2% in 2004. Staphylococcus aureus was the predominant organism in a few studies like S. A H C Loy et al⁶(33.3%) in 2002, Hegde M C et al 2005(44.2%)⁸, Nikakhlagh⁹ et al (24%) in 2008.

In present study no pathogenic organism was isolated in two cases. The reason might be due to

non bacterial or anaerobic bacterial aetiology not isolated by usual laboratory techniques or may be due to presence of antibacterial enzymes such as lysozymes alone or in combination with immunoglobulins in the middle ear fluid that suppressed bacterial growth.

Over the course of years with liberal use of various antibiotics, the bacterial flora in the ear discharge has been showing various types of bacteria & sensitivity.

In this study *Pseudomonas aeruginosa* is the predominant organism.

The reason for predominance may be

- It is normal flora of skin & easily invades the middle ear mucosa through perforation of tympanic membrane.
- It can thrive even in extreme conditions of environment (Low oxygen & little nutrition).
- It has natural resistance to heat & common antibiotics & antiseptics.
- It produces Pyocyanin pigment that inhibits growth of other organisms & exotoxins that produce tissue necrosis.

It is a common organism for causing nosocomial infections.

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