

A HOSPITAL BASED OBSERVATIONAL STUDY TO EVALUATE THE MICROBIOLOGICAL PROFILE AMONG PATIENTS WITH EAR DISCHARGE AT NEWLY ESTABLISHED TERTIARY CARE CENTER

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Abstract

Background: The present study was conducted for evaluating the microbiological profile among patients with ear discharge at newly established tertiary care center. **Materials & Methods:** A total of 100 consecutive patients with ear discharge were included in the study. Relevant history, regarding patient's name, age, sex, nature of discharge, duration of ear discharge and any antibiotic treatment taken were noted in the structured proforma. Every patient had sterile ear swabs taken. The samples were then delivered to the microbiology laboratory for processing. Samples were processed in the lab using sterile swabs: one was used for direct microscopic inspection, while the other was used for bacterial isolation by culture. The second swab was used to inoculate a tube of Brain Heart Infusion Broth (BHI) as well as the blood agar and Mac Conkey's agar plates. Identification of bacterial isolates was done using their colony morphology, motility by hanging drop technique, gram staining and a battery of biochemical tests. **Results:** Gram positive bacteria and gram-negative bacteria was seen in 48 percent and 52 percent of the patients. Staphylococcus aureus, Staphylococcus pyogenes, Streptococcus pneumoniae and Diphtheroid was seen in 28 percent, 7 percent, 3 percent and 5 percent of the patients respectively. Among gram negative bacteria, Pseudomonas aeruginosa, Proteus mirabilis, Escherichia coli and Klebsiella spp. were seen in 32 percent, 8 percent, 10 percent and 1 percent of the patients respectively. **Conclusion:** Staphylococcus aureus and Pseudomonas aeruginosa were the leading cause of ear infections.

INTRODUCTION

The World Health Organization defines chronic suppurative otitis media (CSOM) as ear discharge through a perforated tympanic membrane present for more than 12 weeks. It is characterized by a chronic inflammation of the middle ear and mastoid cavity, followed by permanent abnormality of the pars tensa or flaccida. Varying degrees of edema; submucosal fibrosis and hypervascularity; and infiltration with lymphocytes, plasma cells, and histiocytes result in the production of pus discharge.^[1-3] Ear infection can occur in the outer (Otitis Externa (OE)), middle (Otitis Media (OM)), or inner (Otitis Interna (OI)) parts of the ear. Otitis media or inflammation of the middle ear is the most common and significant disease in the world; it can be suppurative, acute OM (AOM) and chronic OM (COM), or non-suppurative, OM with effusion (OME). Acute otitis media (AOM), COM, and OME are common problems affecting many peoples, especially young children. Acute otitis media (AOM) is the presence of fluid

along with a rapid onset of signs and symptoms of inflammation in the middle ear.^[4-6] Hence; the present study was conducted for evaluating the microbiological profile among patients with ear discharge at newly established tertiary care center.

MATERIALS AND METHODS

The present study was conducted for evaluating the microbiological profile among patients with ear discharge at newly established tertiary care center. A total of 100 consecutive patients with ear discharge were included in the study. Relevant history, regarding patient's name, age, sex, nature of discharge, duration of ear discharge and any antibiotic treatment taken were noted in the structured proforma. Every patient had sterile ear swabs taken. Those who had taken antibiotics for longer than seven days prior to their presentation were not included. Sterile swabs were used to gather clinical samples from the discharging ear, being cautious not to contact the external acoustic canal.

The samples were then delivered to the microbiology laboratory for processing. Samples were processed in the lab using sterile swabs: one was used for direct microscopic inspection, while the other was used for bacterial isolation by culture. The second swab was used to inoculate a tube of Brain Heart Infusion Broth (BHI) as well as the blood agar and Mac Conkey's agar plates. Identification of bacterial isolates was done using their colony morphology, motility by hanging drop technique, gram staining and a battery of biochemical tests. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software.

RESULTS

Mean age of the patients was 46.8 years. The majority of the patients belonged to the age group of more than 40 years. 59 percent of the patients were males while the remaining were females. ASOM was the clinical diagnosis in 10 percent of the patients while CSOM was the diagnosis in 82 percent of the patients. Gram positive bacteria and gram-negative bacteria were seen in 48 percent and 52 percent of the patients. *Staphylococcus aureus*, *Staphylococcus pyogenes*, *Streptococcus pneumoniae* and Diphtheroid were seen in 28 percent, 7 percent, 3 percent and 5 percent of the patients respectively. Among gram negative bacteria, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Escherichia coli* and *Klebsiella* spp. were seen in 32 percent, 8 percent, 10 percent and 1 percent of the patients respectively

Table 1: Demographic data

	Variable	Number	Percentage
Age group (years)	Less than 40	56	56
	More than or equal to 40	44	44
Gender	Males	59	59
	Females	41	41

Table 2: Clinical diagnosis

Clinical diagnosis	Number	Percentage
ASOM	10	10
CSOM	82	82
Otomycosis	3	3
Total	100	100

Table 3: Microbiological profile

	Microbiological profile	Number	Percentage
Gram positive bacteria	<i>Staphylococcus aureus</i>	28	28
	<i>Staphylococcus pyogenes</i>	7	7
	<i>Streptococcus pneumoniae</i>	3	3
	Diphtheroid	5	5
	Others	5	5
Gram negative bacteria	<i>Pseudomonas aeruginosa</i>	32	32
	<i>Proteus mirabilis</i>	8	8
	<i>Escherichia coli</i>	10	10
	<i>Klebsiella</i> spp.	1	1
	Others	1	1

DISCUSSION

Ear is an important sensory organ. It is worthy to note that ear infections are a very common problem worldwide. Ear infection is an inflammation of the ear and ear discharge is one of the commonest symptoms of ear infection. About 65-330 million people suffer from ear infection worldwide and 60% of them had significant hearing impairment. The discharging ear is a common problem in the tropics. It is seen in all age groups but is more prevalent in infants and children. It's decreasing incidence during and after adolescent stage is the result of the growth and development of the pharynx. It is a disease of multiple etiology.^[7] It is well known for its persistence and recurrence inspite of treatment. Its importance lies in its refractoriness to treatment and chronicity leading to complications. It is a major cause of acquired hearing impairment in children,

especially in developing countries. Most approaches to treatment have been unsatisfactory or are very expensive and difficult. It is an important cause of preventable hearing loss, particularly in the developing world.^[8-10]

The pathogenesis of CSOM remains poorly understood. Complex interactions between the environment, microbes, and host are thought to lead to the development of this multifactorial disease. Topical and oral antibiotics are prescribed to patients based on bacterial culture results when available, but the clinical benefit of antibiotic therapy is not always clear. Surgery may prevent local, regional, or systemic complications, but some patients may continue to have ear discharge postoperatively. Research into the putative microbial causes of CSOM has so far been reliant on culture-based techniques. In these studies, *Staphylococcus aureus* and *Pseudomonas aeruginosa* were the most commonly

isolated bacteria, with methicillin-resistant *S. aureus* (MRSA) isolated in some cases. However, there are treatment failures even when these specific organisms are targeted.^[11-13] Hence; the present study was conducted for evaluating the microbiological profile among patients with ear discharge at newly established tertiary care center.

Mean age of the patients was 46.8 years. Majority of the patients belonged to the age group of more than 40 years. 59 percent of the patients were males while the remaining were females. ASOM was the clinical diagnosis in 10 percent of the patients while CSOM was the diagnosis in 82 percent of the patients. Gram positive bacteria and gram-negative bacteria were seen in 48 percent and 52 percent of the patients. *Staphylococcus aureus*, *Staphylococcus pyogenes*, *Streptococcus pneumoniae* and *Diphtheroid* were seen in 28 percent, 7 percent, 3 percent and 5 percent of the patients respectively. Our results were in concordance with the results obtained by Gorems, K et al, who also reported similar findings. In their study, authors determined the risk factors and bacterial profile of the isolates from patients with discharging ears. Their study was conducted on 173 patients with draining otitis media. The ear discharge specimens were collected and analyzed by standard microbial techniques. Among 173 otitis media patients participated in the study; majority, 102(63%) were pediatrics, out of which 72 (41.61%) were in the age group of less than 4 years. Ear infection was bilateral in 39 (22.54%) and chronic in 100 (57.8%) of the patients. Pathogens were isolated from 160 (92.5%) of the patients with a total of 179 isolates. The predominant isolate was *Staphylococcus aureus* followed by *Proteus spp.*^[14]

In the present study, among gram negative bacteria, *Pseudomonas aeruginosa*, *Proteus mirabilis*, *Escherichia coli* and *Klebsiella spp.* were seen in 32 percent, 8 percent, 10 percent and 1 percent of the patients respectively. In a similar study conducted by Kaur et al, among the CSOM cases, bacteria were isolated alone in 76.6%, bacteria along with fungi in 13% and fungi alone in 2.6% cases. *Pseudomonas aeruginosa* (33.5%) followed by *Staphylococcus aureus* (19.7%) were the most common bacterial pathogens isolated. Mixed bacterial infections were caused by *Staphylococcus aureus* or *Pseudomonas aeruginosa* along with either CONS or *Diphtheroids*.^[15] The bacterial etiologies among patients suspected with ear infections was studied in another previous study conducted by Getaneh, A et al. They collected retrospective data from bacteriological results of ear discharge samples. Sample collection, culture preparation, and bacterial identification were performed using standard microbiological techniques. The overall ear-discharge culture positivity rate was 283/369 (76.7%) (95% CI = 72.4–81.3), with 14/283 (4.95%) mixed infections. *Staphylococcus aureus* (27.9%), *Proteus spp*s (20.8%), *Streptococcus spp*s (10%), and *Pseudomonas spp*s (8.92%) were the main isolates.^[16]

CONCLUSION

Staphylococcus aureus and *Pseudomonas aeruginosa* were the leading causes of ear infections. Further studies are recommended to explore the types of ear infections, with their etiologic agents and possible risk factors.

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