

Microbiological Evaluation of Otitis Media: An Institutional Based Study

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ABSTRACT

Background: Otitis media is defined as an infection of the middle ear fluid and is the second most common diagnosis in the emergency department following upper respiratory infections. Hence; under the light of above mentioned data, we planned the present study to assess microbiological profile of patients with otitis media.

Materials & Methods: A total of 100 patients with otitis media were included in the present study. From the diseased ear of all the patients, ear discharge was obtained use sterilized swabs. All the swabs were inoculated in 5% sheep blood agar (BA), MacConkey's agar and chocolate agar (CA) and Sabouraud Dextrose Agar with chloramphenicol (0.05%), followed by incubation at 28°C and 37°C. The slants were later examined for gross and the microscopic morphology of the fungi.

Results: Among aerobes, the predominant species identified were *Pseudomonas aeruginosa*, *Kebsiella penmoniae*, *Escherichia coli* and *Diptheoides*. Among anaerobes *Clostridium* species, *Peptococcus* species and *Peptostreptococcus* species were the most commonly

identified species. Among fungal isolates, the most commonly isolated species were that of *Aspergillus niger*, *Aspergillus fumigatus* and *Candida* species.

Conclusion: Aerobic bacteria are the most common isolates among otitis media patients.

Key words: Microbiological, Otitis Media.


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INTRODUCTION

Otitis media is defined as an infection of the middle ear fluid and is the second most common diagnosis in the emergency department following upper respiratory infections. Although otitis media can occur at any age, it is most commonly seen between the ages of 6 to 24 months.¹⁻³

Different types of OM present in different ways. Acute OM (AOM) usually affects children aged under 2 years, and presents with acute onset symptoms and signs of otalgia and fever, in a child that is systemically unwell. It is acute inflammation, and may be caused by bacteria or viruses. A particular subtype of AOM is acute suppurative OM, which is characterized by the presence of pus in the middle ear. If the ear drum perforates (this occurs in approximately 5%, although higher rates have been reported) then ear discharge will be present also; the perforation usually heals spontaneously.⁴⁻⁶

Hence; under the light of above mentioned data, we planned the present study to assess microbiological profile of patients with otitis media.

MATERIALS & METHODS

The present study was conducted in the Department of Microbiology, SMS Medical College, Jaipur, Rajasthan (India) and it included assessment of microbiological profile of patients with otitis media.

A total of 100 patients with otitis media were included in the present study. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. From the diseased ear of all the patients, ear discharge was obtained use sterilized swabs. All the swabs were inoculated in 5% sheep blood agar (BA), MacConkey's agar and chocolate agar (CA) and Sabouraud Dextrose Agar with chloramphenicol (0.05%), followed by incubation at 28°C and 37°C. The slants were later examined for gross and the microscopic morphology of the fungi.

All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

RESULTS

In the present study, a total of 100 patients with otitis media were analysed. Mean age of the patients of the present study was 44.8 years. 45 percent of the patients of the present study belonged to the age group of 40 to 50 years. 55 percent of the patients of the present study were females while the remaining 45 percent were males. Table 3 shows the microbiological profile of patients with otitis media. Majority of the obtained isolates from the otitis media were aerobes. Among aerobes, the predominant species identified were *Pseudomonas aeruginosa*, *Kebsiella penmoniae*, *Escherichia coli* and *Diptheoides*. Among anaerobes *Clostridium* species, *Peptococcus* species and *Peptostreptococcus* species were the most commonly identified species. Among fungal isolates, the most commonly isolated species were that of *Aspergillus niger*, *Aspergillus fumigatus* and *Candida* species.

Table 1: Age-wise distribution of patients

Age group (years)	n
Less than 40	35
40 to 50	45
More than 50	20
Mean age (years)	44.8

Table 2: Gender-wise distribution of patients

Gender	n
Males	45
Females	55

Table 3: Microbiological profile of otitis media

Type of isolate	n	
Aerobic isolates	MSSA	45
	<i>Pseudomonas aeruginosa</i>	17
	<i>Kebsiella penmoniae</i>	9
	<i>Escherichia coli</i>	7
	<i>Diptheoides</i>	5
	Others	4
Anaerobic isolates	<i>Clostridium</i> species	9
	<i>Peptococcus</i> species	8
	<i>Peptostreptococcus</i> species	8
	Others	5
Fungal	<i>Aspergillus niger</i>	9
	<i>Aspergillus fumigatus</i>	8
	<i>Candida</i> species	5

DISCUSSION

Infection of the middle ear can be due to viral, bacterial or coinfection with both. The most common bacterial organisms causing otitis media are *Streptococcus pneumoniae*, followed by non-typeable *Haemophilus influenzae* (NTHi), and *Moraxella catarrhalis*. Following the introduction of the conjugate pneumococcal vaccines, the pneumococcal organisms have evolved to non-vaccine serotypes. The most common viral pathogens of otitis media include the respiratory syncytial virus (RSV), coronaviruses, influenza viruses, adenoviruses, human metapneumovirus, and picornaviruses.⁷⁻⁹

In the present study, a total of 100 patients with otitis media were analysed. Mean age of the patients of the present study was 44.8 years. 45 percent of the patients of the present study belonged to the age group of 40 to 50 years. 55 percent of the patients of the present study were females while the remaining 45 percent were males. In industrialised countries, hearing loss (both conductive and sensorineural) is known to be the third most prevalent chronic condition in older adults after hypertension and arthropathy with considerable implications on physical and mental health. Information on the adult population of less industrialised countries is scanty. A better knowledge of the incidence and prevalence of Otitis media and its complications across ages and geographical regions is necessary to adequately assess the need for interventions aimed at reducing its health, social and economic burden.^{8,9}

Table 3 shows the microbiological profile of patients with otitis media. Majority of the obtained isolates from the otitis media were aerobes. Among aerobes, the predominant species identified were *Pseudomonas aeruginosa*, *Kebsiella penmoniae*, *Escherichia coli* and *Diptheoides*. Among anaerobes *Clostridium* species, *Peptococcus* species and *Peptostreptococcus* species were the most commonly identified species. Among fungal isolates, the most commonly isolated species were that of *Aspergillus niger*, *Aspergillus fumigatus* and *Candida* species. Prakash R et al isolated the organisms associated with CSOM and to detect the antibiogram of the aerobic isolates. A total of 204 patients clinically diagnosed of CSOM were enrolled in the study and the samples were obtained from each patient using sterile cotton swabs and cultured for microbial flora. Drug susceptibility testing for aerobic isolates was conducted using Kirby-Bauer disc diffusion method. The most common causative organisms isolated were *Staphylococcus aureus* (48.69%) and *Pseudomonas aeruginosa* (19.89%) amongst the 191 aerobic isolates. Anaerobes accounted for 29.41% of the isolates while 12.25% were fungi. Antimicrobial profile of aerobic isolates revealed maximum sensitivity to amikacin (95.5%), ceftriaxone (83.4%) and gentamicin (82.7%). Knowing the etiological agents of CSOM and their antimicrobial susceptibility is of essential importance for an efficient treatment, prevention of both complications and development of antibiotic resistance and finally, the reduction of the treatment costs.⁹

Madana J et al defined the microbiology of atticofur type of chronic otitis media and the antibiotic sensitivity pattern, thereby reducing the potential risks of complications. During this study period, 223 children with atticofur type CSOM consisting of 126 males and 97 females with an age range of 1-14 years were assessed. Patients with persistent otorrhea for more than 3 months with atticofur type of chronic otitis media were selected. The exudates were collected under sterile conditions and inoculated onto culture media; bacterial growth and antibiotic sensitivity pattern were studied. Gram negative organisms accounted 58% of total isolates and gram positive organisms constituted 22% isolates. *Candida albicans* and methicillin resistant *S. aureus* were identified in 4% and 2% of isolates, respectively. 100% of *Pseudomonas* isolates showed susceptibility to ceftazidime and a high sensitivity (92% of isolates) to ciprofloxacin and 88% isolates were sensitive to amikacin. 100% of *P. mirabilis* isolated from inoculates showed sensitivity to ceftazidime and ciprofloxacin. It also showed 87-97% sensitivity to

ceftriaxone, amikacin and ampicillin. All (100%) of the *Staphylococcus* isolates were sensitive to vancomycin and 84-86% were sensitive to ciprofloxacin and erythromycin. In general, gram negative organisms showed increased sensitivity to ceftazidime, ciprofloxacin and amikacin, while gram positive organisms to vancomycin, erythromycin and ciprofoxacin. Continuous and periodic evaluation of microbiological pattern and antibiotic sensitivity of cholesteatomatous CSOM is necessary to decrease the potential risks of complications by early institution of appropriate systemic and topical antibiotic alongside mastoid exploration.¹⁰

CONCLUSION

Under the light of above obtained results, the authors conclude that aerobic bacteria are the most common isolates among otitis media patients. Therefore, we recommended continuous and periodic evaluation of microbiological profile of these patients for decreasing the potential risk of complications.

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