



BACTERIOLOGICAL PROFILE AND THEIR ANTIBIOTIC SUSCEPTIBILITY PATTERN IN CASES OF OTITIS MEDIA

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Article Info:

Received: 13/06/2014

Revised on : 20/06/2014

Accepted on: 26/06/2014

ABSTRACT

Background: Otitis media is a disease of multiple aetiologies and is well known for its persistence despite treatment and may result in permanently disabling and potentially fatal complications. The frequent presence of otitis media in general practice and poor response to the routine treatment made us undertake this study. **Aim:** To identify the bacteria causing otitis media and their antibiotic susceptibility pattern. **Method:** Two ear swab were collected one for Gram staining another cultured for bacteria. Biochemical tests were done for identification of the isolate and antibiotic susceptibility testing was done by Kirby-Bauer's disc diffusion method. **Results:** *Pseudomonas aeruginosa* 35.29% and *Staphylococcus aureus* 31.76% which was most effective against tetracycline 88.25%. **Conclusions:** Periodical evaluation of bacteriological profile and their susceptibility pattern helps in choosing presumptive drugs for successful treatment and minimizing complications of CSOM and emergence of resistant strains.

Key words: AST, Bacteriological profile, Otitis media.

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INTRODUCTION

Otitis media is an inflammation of the middle ear that affects the tympanic membrane. [1] Clinically, otitis media may be classified as acute, subacute, and chronic based on the duration of symptoms [2]. Sources of infection in otitis media is mainly dependent on the route by which infection reaches the middle ear and the chief route by which this occurs in the eustachian tube.[3,4] The causes of infection in such cases are nasopharyngeal disease and in children this usually means the adenoids. The causative infections may be in the nose, paranasal sinuses, or in the oropharynx. All these conditions are ascending infection of the eustachian tube.[5] The acute phase of otitis media is considered to be the initial 3 weeks of inflammation, chronic phase 3 months, following the onset of inflammation and sub-acute phase is said to be between 3 weeks and 3 months.[6] If untreated it can lead to irreversible local destruction of middle ear structures and various intracranial and extra cranial complications.[7]

Otitis media is a major health problem of children in developing countries with poor socioeconomic status worldwide, 65-330 million people suffer from otitis media; of these, about 60% experience significant hearing impairment. [8] The etiologies of otitis media differ in geographical area. [9] *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Proteus mirabilis*, *Klebsiella pneumoniae* and *Escherichia coli* found in the skin of the external ear enter into the middle ear through a chronic perforation. [10] Moreover, antimicrobial resistance profile of bacteria varies among population because of difference in geography, local antimicrobial prescribing practices and prevalence of resistant bacterial strains. [11] The aim of this study is to determine the etiological agents and their antibiotic susceptibility pattern in otitis media patients for appropriate treatment.

Materials and Methods

This study on otitis media was carried out in the Department of Microbiology, Mayo Institute of Medical

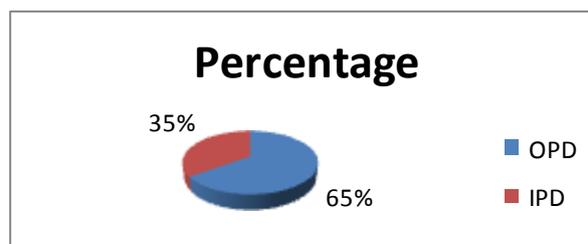
Sciences Barabanki, UP over a period of six months from November 2013 to May 2014. In each patient two sterile swabs were used to collect the discharge, taking care to avoid surface contamination. One swab was used for direct smear examination by Gram's staining and the other swab was used for isolation of the causative organism by culture. The bacterial species then isolated were identified by morphology, cultural characteristics and bio-chemical reactions according to the standard techniques.[12] After identifying the isolate, their antibiotic sensitivity test was done on Muller Hilton Agar using Kirby Bauer method. The plates were read out after overnight incubation, by measuring the zone of inhibition around the antibiotic as per CLSI standards. Gram negative isolates were tested against ampicillin, ampicillin-sulbactam, piperacillin-tazobactam, ceftazidime, ceftriaxone, ceftazidime, cefoxitin, amikacin, gentamicin, ciprofloxacin, imipenem and meropenem. Gram positive isolates were tested with oxacillin, ceftazidime, erythromycin, linezolid, vancomycin, teicoplanin, rifampin, chloramphenicol, cotrimoxazole, ciprofloxacin, gentamicin, amikacin and tetracycline (Hi Media, India). [13] *E. coli* ATCC 25922 and *S. aureus* ATCC 25923 was used as a quality control strain.

Result and Discussion

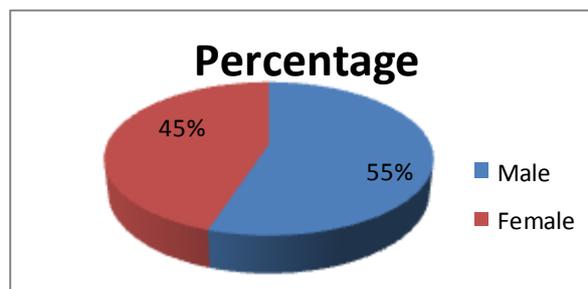
Out of total 100 patients studied, male patients was 55 where as female 45 and 65 were OPD, 35 IPD in which 80 patient's ear discharge samples showed positive growth, otitis media accounting for 80%. Out of 80 cultures positive 93.75% showed single isolate and 6.25% showed multiple isolate of two bacteria. This study also supported by R Shyamala; with male 57 and female 43 in which culture positive was 93%.[14] Arti Agrawal et al. found single isolates 80% and multiple isolates 8 %.[15] In this study incidence (77.77%) of otitis media was the highest in 0 to 20 years age group [Table 4] and this finding corresponds with the work published by other authors Gulati et al.[16] The present study shows right Ear was most predominant side of infection 60%. (Table 3) Study by R Shyamala, also reported right Ear 62%, left Ear 33% and both Ear 6.4% [14] (Table 5) shows the incidence of various aerobes isolated from Ear discharge specimens. *Pseudomonas aeruginosa* was the most predominant species in 35.29%, followed by *Staphylococcus aureus* 31.76%, According to Prakash m. study, The most common organism isolated in this study was *Staphylococcus aureus* (41.25%) followed by *Pseudomonas* species (37.5%). *Klebsiella pneumoniae*, *Escherichia coli*, *Proteus* sp, and Coagulase Negative *Staphylococcus aureus* were the

organisms isolated. [17] Similar study by Vishal Sharma, *Pseudomonas aeruginosa* (47.2%) was the most commonly isolated organism followed by *Staphylococcus aureus* (27%), coagulase negative *staphylococci* (14%), *Klebsiella* spp. (5%), *Proteus* spp. (3.4%),[18] In present study (Table 5, 6) showed GNB were most effective to imipenem, meropenem 100%, tetracycline 80% and GPC were most effective to vancomycin 100%, linezolid 82.5%, and tetracycline 96.5%. Over all tetracycline was effective against both GNB and GPC 88.25%. Similar study by Sudhindra.K.S also reported GNB were susceptible to meropenem and piperacillin/tazobactam in 97.2% of isolates followed by ceftriaxone/sulbactam in 95.8% of isolates and others. Other Gram negative isolates were sensitive to the routinely used antibiotics. *Staphylococcus aureus* was 100% sensitive to linezolid and vancomycin. [19]

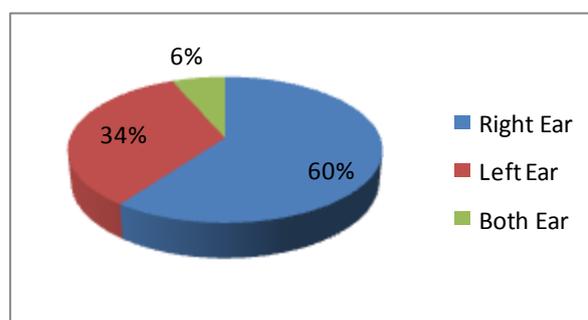
1. Ward wise distribution.



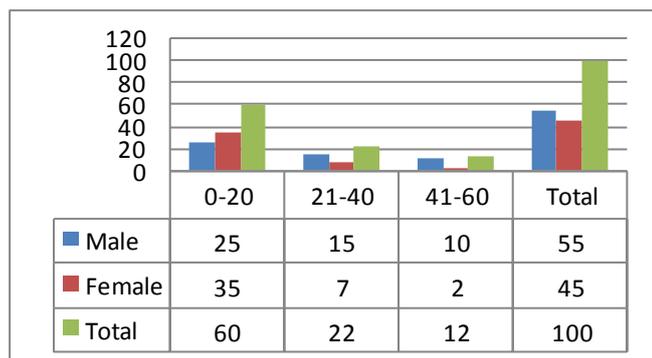
2. Sex wise distribution.



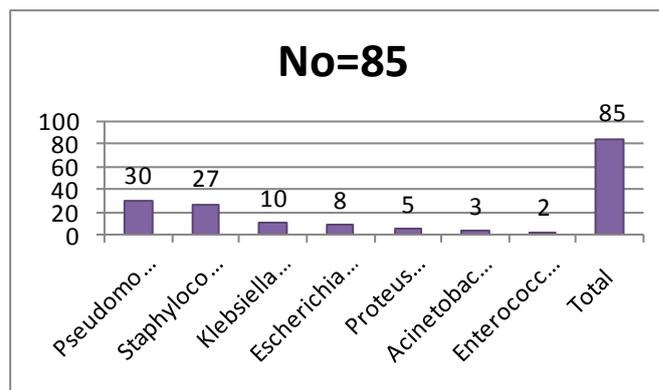
3. Predominant side of otitis media.



4. Age and sex wise prevalence of otitis media.



5. Incidence of isolates.



Organism	AMP	AS	PIT	CTX	CAZ	CX	AK	GEN	CIP	PIT	TE	IPM	MP
<i>Pseudomonas aeruginosa</i>	43	55	68	70	67	60	70	75	72	78	87	98	98
<i>Klebsiella Pneumoniae</i>	40	60	63	65	58	53	65	78	60	79	82	100	100
<i>Escherichia coli</i>	50	70	70	75	78	60	71	80	72	73	75	100	100
<i>Proteus spp</i>	40	50	65	67	65	58	59	70	60	77	78	98	98
<i>Acinetobacter spp</i>	60	65	71	69	67	53	68	72	58	80	80	98	98

Organism	OX	CX	E	LZ	VA	TEC	RF	CH	COT	CIP	GEN	AK	TE
<i>Staphylococcus aureus</i>	47	53	65	85	100	72	69	73	71	63	75	78	98
<i>Enterococcus spp</i>	49	59	59	80	100	73	66	67	72	68	72	71	95

CONCLUSION

Majority of the cases were of the age 1-20 yrs (77%). The overall 80% incidence was found to be higher in males (55%) as compared to females (45%). Mainly *Pseudomonas aeruginosa* and *Staphylococcus aureus* which was most effective against tetracycline 88.25%. Knowledge of the pathogens and antibiotic sensitivity pattern responsible for otitis media and choosing suitable antibiotics according to susceptibility tests should guide the management of disease treatment and reduces intracranial and extra cranial complications with otitis media.

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