Bacteriological Study of Discharging Ear in Patients of Active Mucosal Chronic Otitis Media Attending a Tertiary Care Hospital

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ABSTRACT

Background: Chronic otitis media (COM) is one of the most commonly encountered diseases in the otolaryngology practice. Active mucosal COM is one of the four types of COM.Active mucosal chronic otitis media is a longstanding infection of a part or whole of mucoperiosteal lining of middle ear cleft characterized by ear discharge and a permanent perforation. This is more prevalent in the underdeveloped countries and having potential complications. It is a disease well known for its recurrence and persistence despite treatment. The main contributing factor is improper use of antibiotics. So the knowledge of local pattern of infection is essential for efficacious treatment.

Objective: To identify the microbes involved in active mucosal COM and their antimicrobial sensitivity against the commonly used antibiotics.

Material & Methods: This was a Cross sectional study, conducted in ENT Department, Saidu Teaching Hospital Saidu Sharif Swat, KPK Pakistan from January 15th, 2018 to July 16th, 2018. A total of 107 patients were included with active mucosal COM in whom ear discharge had not subsided despite antibiotic treatment with central tympanic membrane perforation and had not recently taken antibiotics in the previous seventy two hours. Patients not willing for the study and fulfilling the set exclusion criteria were excluded. Written informed consent, history and otologic examinations were carried out. Following all aseptic measures, specimen for pus culture was collected by swabbing the discharging ear with a sterile cotton swab and sent to microbiology laboratory for further processing of culture and sensitivity. Data collected on a predesigned Performa was analyzed through SPSS 21.

Results: Out of total 107 patients, 64.5% were male and 35.5% were female. The peak incidence of growth was observed in the age range 4 to 20 years. Out of 107 ear swabs processed 80 samples showed pure culture, 5 samples showed mixed culture and No growth in 22 samples. Pseudomonas (33.6%) was the frequently isolated organism followed in order of frequency by Staphylococcus Aureus (9.3%), MRSA (7.5%), Proteus Species (7.5%) Streptococcus Mitis (3.7%) and E.coli (3.7%) along with some other less common bacteria. Psedomonas and Staphylococcus Aureus were mainly sensitive to Cefoperazone/Sulbactam, Meropenim, Imipenem and Ciprofloxacin.

Conclusion: Pseudomonas Aeruginosa and Staphylococcus Aureus are the commonly involved microbes in active mucosal COM mainly sensitive to Cefoperazone/Sulbactam, Meropenim, Imipenem and Ciprofloxacin.

Key words: *Ear Discharge, Chronic Otitis Media, Antimicrobial Sensitivity*

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INTRODUCTION

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.[1]Chronic otitis media (COM) is defined as chronic inflammation of middle ear cavity that may present with recurrent ear discharges through a tympanic membrane perforation.[2] Chronic otitis media is one of the common problems being presented at outpatient department of Otorhinolaryngology. It affects all ages [3] and both sexes, being more common in childhood, often following acute otitis media, secondary to upper respiratory tract infections [4].

Prevalence of COM is more in the developing and underdeveloped countries. It is also common among the poorer sections of the developed world. The incidence is highest among low hygiene populations or with overcrowding and malnutrition.[5]The chronic form of otitis media is a major problem in developing countries like Pakistan.

Most of the studies on the microbiology of COM have revealed that the most common bacteria associated with COM are *Pseudomonas, Staphylococcus aureus, Proteus and Klebsiella.*[6]Topical preparations containing antibiotics and steroids, to reduce otorrhea and to provide local anti-inflammatory effect are the mainstays of medical management of chronic otitis media.[7]

The knowledge of the pattern of local antibiogram is not only important for efficient and cost effective treatment of COM, but is essential to prescribe the sensitive antibiotic against specific bacteria based on culture and sensitivity report, as the drug resistance is on the rise among bacteria.

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The objective of the study is to identify the microorganism in patients with active mucosal disease, who have been previously treated with antibiotics without knowing the causative microorganism and its sensitivity pattern. The sensitivity pattern will be used to direct specific antibiotic therapy to resolve the ear discharge of active mucosal COM. This will help not only in specific antibiotic directed management to reduce bacterial resistance, but also in preventing COM complications and unnecessary use of antibiotics. In addition the susceptibility pattern will help us to formulate antibiotic policy for COM for better management of the patient.

MATERIAL AND METHODS

This Cross sectional study was conducted in the Outpatient Department (OPD) of ENT Saidu Teaching Hospital Saidu Sharif Swat from January 15, 2018 to July 16, 2018.Patients with active mucosal COM in whom ear discharge had not subsided despite antibiotic treatment with central tympanic membrane perforation and had not recently taken antibiotics in the previous seventy two hours of either gender having age between 4 and 60 years were selected for the study. Written informed consent was taken from all the patients meeting the inclusion criteria. Patients having otomycosis, cholesteatoma, complications of COM, previous ear surgery or not willing to participate in the study were excluded. Detailed history regarding age, gender, duration and side of discharge and antibiotic treatment was taken, Otoscopic examination was carried out to confirm the central tympanic membrane perforation. Before collecting the ear discharge, asceptic techniques were observed by cleaning the external auditory canal. Specimens for swab culture were collected under microscope by swabbing the discharge ear with a sterile dry micro cotton swabs and sent to a single microbiology laboratory after labelling with patient ID and ear laterality. The swabs were inoculated onto blood agar, Chocolate agar and MacConkey agar for growth characteristics of microorganism and the inoculated plates were incubated at 37C° for 24 to 48 hours. The pathologic organism was confirmed by Gram stain and other biochemical reactions. Isolates yielding pure cultures were further studied for antimicrobial sensitivity and resistance, using the drugs from prescribed medications for patients with COM.The data was collected and analyzed using SPSS 21.Variables were presented as frequencies and percentages.

RESULTS

Out of total 107 patients, 69 (64.5%) were male and 38 (35.5%) were female patients.

Age range was 4 to 60 years. The peak incidence of growth was observed in the age range 4 to 20 years.

The study showed, out of 107 ear swabs processed 80 (74.8%) samples showed pure culture, 5 (4.7%) samples showed mixed culture. No growth was observed in 22 (20.6%) samples (Table 1).

Right side (56%) was common for ear discharge than left (44%) as shown in Table 2.

Table 1 CULTURE PATTERN

Culture		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PURE GROWTH	80	74.8	74.8	74.8
	MIXED GROWTH	5	4.7	4.7	79.4
	NO GROWTH	22	20.6	20.6	100.0
	Total	107	100.0	100.0	

Table 2 SIDE OF EAR DISCHARGE

Side of Infection		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RIGHT SIDE	60	56.0	56.0	56.0
	LEFT SIDE	47	44.0	44.0	100.0
	Total	107	100.0	100.0	

Table 3 ISOLOATED ORGANISM

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Bacteria	22	20.6	20.6	20.6
	Pseudomonas Aeruginosa	36	33.6	33.6	54.2
	Staphylococcus Aureus	10	9.3	9.3	63.6
	MRSA	8	7.5	7.5	71.0
	Streptococcus Mitis	4	3.7	3.7	74.8
	Proteus Species	8	7.5	7.5	82.2
	E.Coli	4	3.7	3.7	86.0
	Citrobacter species	2	1.9	1.9	87.9
	Proteus Miribalis	8	7.5	7.5	95.3
	Mixed Growth	5	4.7	4.7	100.0
	Total	107	100.0	100.0	

Table 4: Pseudomonas Sensitivity to Antibiotics

Antibiotics	Frequency	Percent
Meropenim	34	94.4
Imipenem	31	86.1
Cefoperazone/Sulbactum	30	83.3
Piperacillin-Tazobactum	29	80.5

Out of 85 isolates, Pseudomonas were 36, Staphylococcus Aureus (10),MRSA (8), Streptococcus Mitis (4), Proteus Species (8), E.coli (4), Citrobacter species(2), Proteus Mirabilis (8) and Mixed Growth were 5,as outlined in Table 3.

The most frequently isolated organism ie Pseudomonas Aeruginosa was found sensitive to Cefoperazone/Sulbactam (30),Imipenem (31),Meropenim (34),Piperacillin-Tazobactum (29) and was found resistant to Augmentin, Cefixime, Gentamycin, Doxycycline, Ceftriaxone and Sulphamethaxazole as shown in Table 4.

DISCUSSION

Chronic otitis media is one of the common ear diseases of early childhood. Small socioeconomic status, overcrowding, bad hygiene and malnutrition has been suggested as contributing factors in under developed countries.[8] Chronic otitis media is a disease of insidious onset and can have serious complications if not treated properly and timely.[9]

The present study showed, out of 107 ear swabs processed 80 samples showed pure culture, 5 samples showed mixed culture. No growth was observed in 22 samples. This is in agreement with other previous studies.[10, 11] In the present study, out of 107 cases of ear discharge, the highest incidence was observed in the age group, 4 20 years (58.9%).In our study, males were more commonly affected than females and which is in concordance with findings of a Pakistani study Ahmad et al (1999).[12] Earlier published reports indicate that COM may be unilateral or bilateral. Right ear discharge was present in 56.0% while 44.0% showed discharge from the left side. Out of 107 isolates, Pseudomonas were 33.6%, followed in order of frequency by Staphylococcus Aureus (9.3%), MRSA (7.5%), Proteus Species (7.5%) Streptococcus Mitis (3.7%) and E.coli (3.7%) along with some other less common bacteria. In 20.6% no growth was obtained, the probable reason may be nonbacterial or anaerobic bacterial etiology not isolated by usual laboratory techniques Results of the present study showed P. aeruginosa and S. aureus as the most common isolates from active COM infections. This is in tandem with the observations made by many other authors.[13,14]

Pseudomonas showed high sensitivity to Meropenim 34 (94.4%), Imipenem 31 (86.1%), Cefoperazone/Sulbactam 30 (83.3%), and piperacillin-Tazobactum 29 (80.5%). Ciprofloxacin antibacterial activity against Pseudomonas isolates was reported by others, although resistant strains of Pseudomonas isolates to fluoroquinolones were detected in other studies.[15,16]

The Pseudomonas was found resistant to Sulphamethaxazole, Ampicillin/Clavulanic acid, Doxycycline and Ceftriaxone.

Staphylococcus aureus was sensitive to gentamicin (90 %), ciprofloxacin (90%), cefixime (80%) and Doxycycline (70%). Majority were resistant to penicillin (80%) and ampicillin (60%).Clinical resistance of Staphylococci spp. to penicillin and other antimicrobial agents is now a problem throughout theworld.[17, 18] Staphylococci spp. sensitivity to ciprofloxacin is in agreement with other reports and most of the investigators reported high sensitivity rate for Staphylococci spp. to fluoroquinolones.[16]

CONCLUSION

This study has shown that various microorganisms are involved in active mucosal COM having different sensitivity pattern to antibiotics. Pseudomonas Aeruginosa is the most commonly involved organism, followed by Staphylococcus Aureus. Both the microbes are sensitive to Cefoperazone/Sulbactam, Meropenim, Imipenem and Ciprofloxacin. Appropriate antimicrobial drugs should be prescribed after proper diagnosis of the causative organism and its antimicrobial susceptibility pattern to decrease the risk of resistance to the commonly used antibiotics.

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