

Original Article

Bacteriological Profile Of Ear Discharge And Their Antibiotic Sensitivity In Chronic Suppurative Otitis Media In Kashmir,India

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Objective

The objective of the study was to study the microflora and the antibiograms of patients with chronic suppurative otitis media (CSOM) in Kashmir, in order to provide a guidelines for making a protocol for empirical antibiotic therapy. Study design: Prospective study **Material and methods:** This study was conducted on OPD basis in Department of Ear, Nose and Throat and HNS Government medical college Srinagar kashmir from July 2010 to June 2011 and one hundred twenty five (125) patients with unilateral or bilateral active chronic suppurative otitis media were prospectively studied. They had chronic ear discharge and had not received antibiotics for the previous five days. Swabs were taken from discharging ear's and sent to microbiological section of hospital where culture for bacteria was done. Antibiotic sensitivity testing was done with standard antibiotic discs using Kirby-bauer disk diffusion method. **Results:** From the Clinical specimens off the 125 patients microbiological culture was positive in 110 specimens. The most common causal organisms isolated were Staphylococcus aureus (48%) including 8% of methicillin resistant staph aureus and Pseudomonas aeruginosa (16%) followed by coagulase negative. Antibiotic sensitivities of staph aureus (other than MRSA) showed that 72% isolates were sensitivity to gentamicin, 55% to ciprofloxacin followed by 36% to cephalosporins (cefazidime, ceftriaxone). For pseudomonas aeruginosa 72% isolates were sensitive to piperacillin/tazobactam 48% to ciprofloxacin and 32% to ceftazidime/ceftriaxone. Of the three antibiotics commonly available as topical eardrops, ciprofloxacin and gentamicin has the highest susceptibility rate.

Keywords: Microbiology, chronic otitis media, antibiotic sensitivity, topical drops.

Introduction

Chronic suppurative otitis media (CSOM) is a commonly encountered infection of the middle ear in all parts of world. It is a condition of the middle ear that is characterised by persistent or recurrent discharge through a chronic perforation of the tympanic membrane. Due to the perforated tympanic membrane, bacteria can gain entry into the middle ear via the external ear canal. Infection of the middle ear mucosa subsequently results in ear discharge. Untreated cases of CSOM can result in a broad range of complications. These may be related to the spread of bacteria to structures adjacent to the ear or to local damage in the middle ear itself. Such complications range from persistent otorrhoea, mastoiditis, labyrinthitis, facial nerve paralysis to more serious

intracranial abscesses or thromboses^{1,2,3}. So the knowledge of the local pattern of infection is essential to enable efficacious treatment of this disorder. The goal of management are to to achieve a safe, dry ear, eradicate disease and improve hearing. The objective of this study was to determine the microbial profile (aerobic and anaerobic) and the antibiograms of active CSOM patients in Kashmiri population. CSOM is very common in our set up and is seen mostly in populations from far flung areas with low socio economic status.

Methods

This study was conducted on Out patient basis in Department of Ear, Nose and Throat and HNS Government Medical College Srinagar, kashmir

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from July 2010 to June 2011 and one hundred twenty five patients (125) were prospectively studied. An informed consent was obtained from all the patients. All patients had perforated tympanic membranes with active purulent discharge. Detailed clinical history regarding age, sex, duration of discharge and antibiotic treatment were taken. Only patients who had not received antibiotic therapy (topical or systemic) for the previous five days were included in the study. There is a lot of debate whether the presence of cholesteatoma influences microbiological findings³. So the patients with ear disease due to cholesteatoma were excluded from the study.

Single use Mini-tip Culture swabs were used to harvest the middle ear microflora through the tympanic membrane perforation. All the care was taken to avoid surface contamination and the swabs were transported to microbiology section of hospital for further processing. One swab was processed for aerobic bacteria, and another swab for anaerobic bacteria, using standard microbiological procedures with enrichment. All organisms isolated were identified according to standard microbiological methods. Antimicrobial susceptibility tests were performed using modified Kirby-Bauer disc diffusion method and using national committee for clinical laboratory standards (NCCLS) for breakpoints for interpretation of results^{4,5}. Apart from the standard antibiotics, testing was also done specifically for gentamicin, neomycin and chloramphenicol, which are available locally as topical antibiotic eardrops.

Results

The mean age of patients was 25 years, with the peak age group being between 20-45 years (Table I). There was almost equal distribution between sexes (male 56% and females 44%).

Age range in years	Number of patients
<10	02
11-20	30
21-30	45
31-40	05
41-50	25
51-60	15
61-70	03

From the 125 patients enrolled in the study, there were 110 (88%) isolates. Sixty nine (69) patients (62.3%) had a single organism isolated from the middle ear culture, while the remaining 41 patients had two or more organisms isolated. There were only fifteen patients (12%) who had a sterile culture with no organisms isolated (Table II). The most common causal organisms isolated were *Staphylococcus aureus* (40%), *Pseudomonas aeruginosa* (16%) and followed by MRSA and coagulase negative *Staphylococcus*. The antimicrobial sensitivities of the bacteria were tested and the results for the three most common organisms are shown (Figs. 1 table II). Of the three antibiotics that are available commonly as topical eardrops, gentamicin has the highest susceptibility rate (82.6%) for all the isolates tested, followed by neomycin (67.8%) and chloramphenicol (62.8%).

Gram stain	Microorganism	Number	%age
GRAM +VE n=65	<i>Staphylococcus aureus</i>	50	40%
	<i>Coagulase negative Staphylococcus</i>	06	4.8%
	<i>MRSA</i>	10	8%
GRAM -VE n = 60	<i>Pseudomonas aeruginosa</i>	20	16%
	<i>Enterobacter sp</i>	05	4%
	<i>Escherichia coli</i>	05	4%
	<i>Proteus mirabilis</i>	04	3.2%
	<i>Citrobacter</i>	06	4.8%
	<i>Bacterioids</i>	04	3.2%
	<i>No growth</i>	15	12%
Total		125	100%

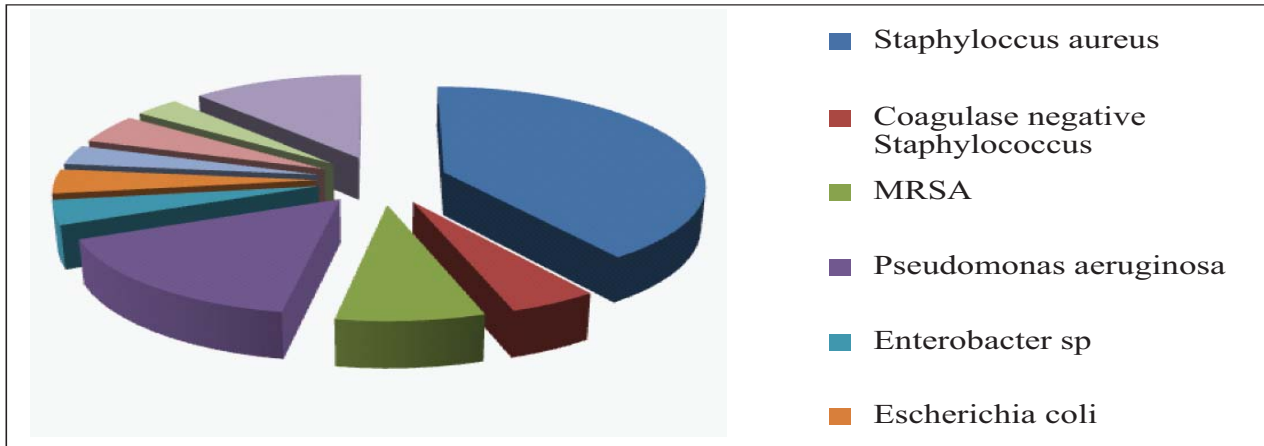


Figure I Microbiological profile of CSOM in Kashmir

Table III. Antibiotic sensitivity pattern of major isolates

STAPH	Ampicillin	Amoyclav	Tetracycline	Gentamycin	Cephalosporin	Ciprofloxacin
S %	12	12	12	72	36	55
R %	08	04	04	25	20	08

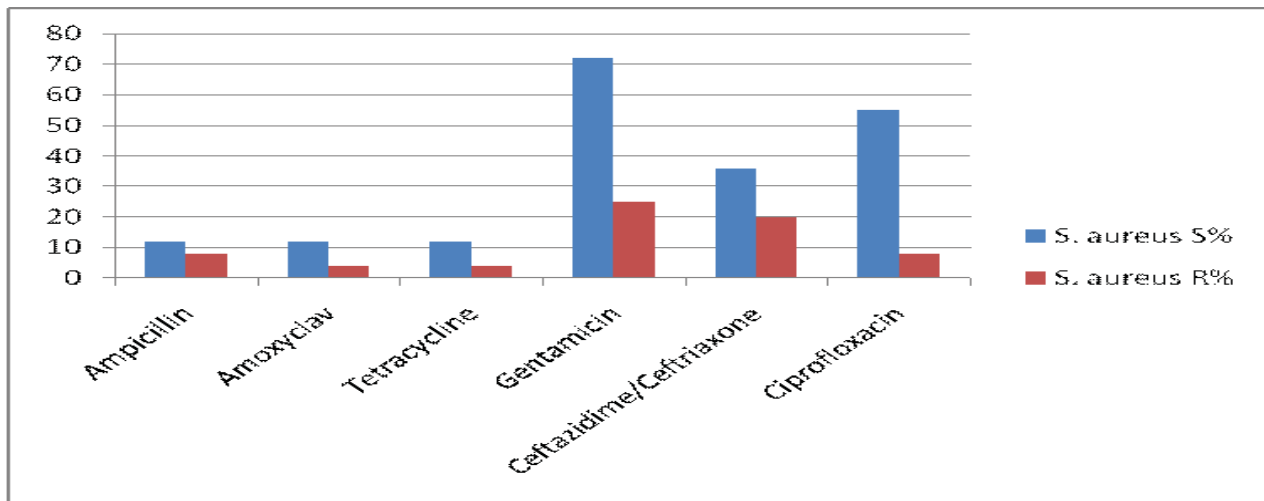


Figure II. Antibiotic sensitivity profile of Staphylococcus aureus

PSEUDOMONAS	Amikicin	Ceftazidime	Gentamycin	Cephalosporin	Ciprofloxacin	Piperacillin/tazo
S%	16	12	08	32	48	72
R%	04	10	04	16	16	16

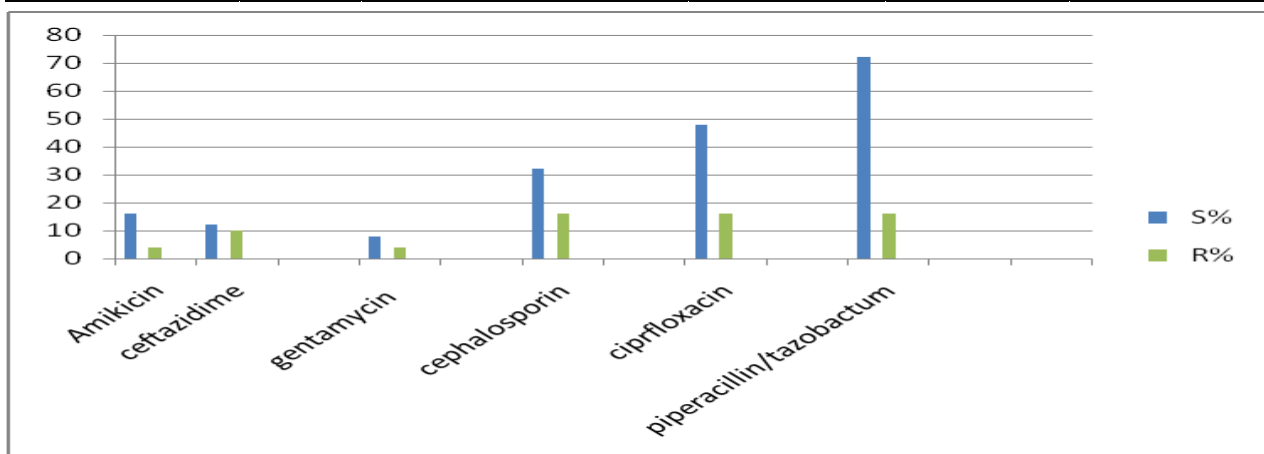


Figure III. Antibiotic sensitivity of Pseudomonas

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Discussion:

Chronic suppurative otitis media and its complications are among the most common conditions seen by otologists and general practitioners. It is a condition of the middle ear that is characterised by persistent or recurrent discharge through a chronic perforation of the tympanic membrane. Due to the perforated tympanic membrane, bacteria can gain entry into the middle ear via the external ear canal. Infection of the middle ear mucosa subsequently results in ear discharge. Untreated cases of CSOM can result in a broad range of complications. These may be related to the spread of bacteria to structures adjacent to the ear or to local damage in the middle ear itself. Such complications range from persistent otorrhoea, mastoiditis, labyrinthitis, facial nerve paralysis to more serious intracranial abscesses or thromboses.^{1,2}

While the incidence of such complications is low, they need to be borne in mind when faced by a patient with active CSOM. Treatment hence needs to be instituted early and effectively to avoid such complications. The mainstay of treatment for uncomplicated CSOM is twofold: meticulous aural toilet (with suction/mopping up of ear debris and discharge) and instillation of a topical and systemic antimicrobial agent. The therapeutic use of antibiotics is usually started empirically prior to results of microbiological culture. Selection of any antibiotic is influenced by its efficacy, resistance of bacteria, safety, risk of toxicity and cost. Knowledge of the local microorganism pattern and their antibiotic sensitivity is then essential to allow for effective and cost-saving treatment. Microbiology cultures yield many, frequently multiple, organisms and these vary depending on climate, patient population and whether antibiotics have or have not been recently used. Various studies have reported thus different isolates in differing proportions³. Our study revealed that active CSOM infection in Kashmiri population is mainly due to *Staphylococcus aureus* & *Pseudomonas aeruginosa* followed by MRSA, coagulase negative staphylococcus. *Staph aureus* spp were by far the most common, although various such studies in different regions have shown that *pseudomonas* spp to be the more common². Our study has revealed that *staph aureus* is more common here than *pseudomonas*. This finding is in tandem with the pattern of CSOM infection within the tropical region.

The antibiotic susceptibility pattern of *staph aureus*

showed that 72% were sensitive to gentamicin, 55% to ciprofloxacin followed by combined sensitivity to ceftazidime and ceftriaxone in 36%. Antimicrobial sensitivity of *pseudomonas aeruginosa* in our study revealed that piperacillin/tazobactam sensitive in 72%, ciprofloxacin are sensitivity in 48% and 32% were sensitivity to cephalosporins. Previously amoxicillin/ampicillin were used frequently than quinolones for acute and chronic middle ear infections in our set up. But the present study has clearly revealed a changing behaviour of microorganisms, showing more sensitivity to quinolones, cephalosporins and gentamycin. Also the clinicians use to avoid the use of quinolones due to their adverse effects on cartilage in growing children after their prolonged usage. However it has been documented that quinolones can be used if required in children in children without any apprehensions^{6,7}. So the use of ciprofloxacin has been found superior both empirically and topically. Among the most commonly available topical antibiotic solutions gentamycin and neomycin has shown promising results after ciprofloxacin. Added advantage of ciprofloxacin ear drops over gentamycin is not being ototoxic⁸. There remains, however a controversy over the question of ototoxicity of with the topical usage of aminoglycoside (gentamicin). While the systemic use of aminoglycoside has been known to have a deleterious effect on inner ear.

The fact that the disease process in CSOM itself causes a sensorineural hearing loss⁸. have led many to conclude the benefits derived from the usage of topical aminoglycosides in the treatment of CSOM and the prevention of attendant complication far outweigh the ototoxic side-effects which may potentially occur.

Keeping in view the high prevalence of *staphylococcus aureus* and *pseudomonas* in our set up and their high susceptibility to quinolones (ciprofloxacin) and cephalosporins (ceftazidime, ceftriaxone) ciprofloxacin ear drops or systemic therapy of ciprofloxacin, piperacillin or ceftazidime/ceftriaxone can be used safely in all age groups. However injudicious use of such drugs can lead to emergence of drug resistant isolates especially in *staph. aureus* and *pseudomonas*⁹, as has previously been experienced. There should therefore be judicious usage of this class of antibiotics in all types of otitis media.

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