



A Microbiological and Clinicopathological Study of Patients with Active Chronic Suppurative Otitis Media

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ABSTRACT

The present study conducted in the Department of Otorhinolaryngology. 50 patients with CSOM of all age groups and both sexes attending the OPD, were selected randomly for the study. Each case of CSOM was examined clinically as per proforma and ear swab was taken by aseptic precaution and sent to Microbiology Department for culture and sensitivity. In the present study the minimum age of the patient was 3 years and maximum age was 66 years. The maximum number of patients were in the age group of 21-30 years (23.2%), and next between 11-20 years (17.8%). The cause for increased incidence in this age group was due to recurrent upper respiratory tract infection. MEDIA" out of 50 cases, males were 44% and females were 56%. In the present study, majority of organisms isolated were P. aeruginosa (41.07%) and next was S. aureus (26.79%) followed by Klebsiella (8.93%), E. Coli (5.36%). There was no growth in 8.93% and commensal was found in 1.8% of ear discharge. In the present study majority of the infection among the study patient was Tubo-Tympanic disease (71.42%) and next was Attico-Antral disease (23.21%). In the present study 60.7% were gram negative organisms and 28.57% were gram positive organism. 13% of infection did not have any growth. In the present study majority of pseudomonas infection showed mucopurulent type of discharge (50%), followed by S aureus (33.3%). Mucoid discharge was common in pseudomonas (27%) and Klebsiella (16.6%). In the present study, gram negative organisms were found to be highly sensitive to Cf, G and Ak. The gram positive organisms were highly sensitive to A, Ak, G, Cf. P. aeruginosa was maximum sensitive to Cf (91.3%) followed by G (82.6%), Ce (73.9%) and Ak (65.2%) klebsiella had high sensitive to Cf and G (both being 100%) followed by Ak and Ce (both being 80%). Proteus had 100% sensitivity to Cf and G followed by Ak, Ce (66.6%), E coli had 100% sensitivity to Ak, Cf, G and Ce. S. aureus had high sensitivity to Ak (80%) followed by G, Ce, Cf (all being 66.6%). Acinetobacter had 100% sensitivity to Ak, Cf, G. So it was concluded that P. aeruginosa, S. aureus, Klebsiella and E. coli were the common organisms responsible for the pathogenicity of CSOM and antibiotic of choice are Cf, G, Ak, Ce.

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Key Words

Otitis media, p. aeruginosa, mucoid discharge, klebsiella, antibiotic

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INTRODUCTION

The assessment and management of CSOM presents many challenging and fascinating problems. The state of individual ear involved in chronic disease represents the balance established at a particular time between the progression of the disease process on one hand and the healing response within the middle ear cleft on the other. Accordingly the manifestations of CSOM are extremely variable and there may be any lesion from a small healed deformity of the Tympanic Membrane (TM), to a cholesteatoma infiltrating widely throughout the temporal bone. CSOM is a disease of multiple aetiology and is well known for its persistence and recurrence inspite of treatment. CSOM is a name given to a long standing inflammatory disease affecting mucoperiosteal lining of the middle ear. It is a destructive and persistent disease with irreversible sequelae and can proceed to serious intra and/or extra cranial complications^[1-3]. CSOM is divided into two types according to presence or absence of cholesteatoma. Bacteriologically and etiologically both types are different. Noncholesteatomatous type is usually result of incompletely treated acute suppurative otitis media or recurrent suppurative otitis media. Important feature of this type of disease is the presence of central perforation., however, in cholesteatoma type perforation is either marginal or attic^[4-6]. The wide spread use of antibiotics has precipitated the emergence of multiple resistant strains of bacteria which can produce both primary and post operative infections. The indiscriminate, haphazard and half treated use of antibiotics and poor follow up of patients have resulted in persistence of low grade infections^[7]. Changes in the microbiological flora following the advent of sophisticated synthetic antibiotics increase the relevance of reappraisal of the modern day flora in CSOM and their in vitro antibiotic sensitivity pattern is very important for the clinician to plan a general outline of treatment for a patient with a chronically discharging ear. The incidence of CSOM appears to depend on race and socio-economic factors. Socio-economical factors such as poor living conditions and over crowding, poor hygiene and nutrition have been suggested as a basis for the wide spread prevalence of CSOM^[8-14]. The present study is aimed at finding the organisms responsible for CSOM by taking the ear swab for culture an FFd sensitivity and by treating the patient according to culture report. The response to the treatment is studied and analyzed.

MATERIALS AND METHODS

The present study was conducted in the Department of Otorhinolaryngology on 50 patients with CSOM of all age groups and both sexes attending OPD were selected randomly for the study.

Inclusion Criteria: All cases of middle ear discharge for >3 months.

Exclusion Criteria:

- Condition which mimic CSOM like.
- Otitis externa.
- Acute suppurative otitis media.
- Complications of CSOM.

History Taking and Examination: A proforma (Annexure-I) was filled for each patient documenting age, sex, address and clinical information, including chief complaints, duration of symptoms, predisposing factors and any previous history of treatment. Other medical history like diabetes mellitus, hypertension and tuberculosis, etc were noted. Examination under microscope was done and patients were categorised into tubotympanic and Atticoantral type of CSOM and ear discharge was collected.

Collection of Sample: Ear discharge was collected under aseptic precautions in clinically diagnosed cases of CSOM. Excess discharge was mopped out from external auditory canal and it was cleaned with betadin. Then with the sterile swab, specimen was collected and sent immediately to Microbiology Department with a requisition for culture and sensitivity.

Direct Smear Examination: In Microbiology Department, a thin smear was made on a clean glass slide and was fixed with 95% methanol, by pouring one or two drops on the smear and allowed to act for a minimum of 2 minutes or until the methanol dries on the smear. Gram staining was done for the smears so made and was examined under oil immersion objective to note the various morphological types of bacteria, their number, Gram reaction, presence or absence of inflammatory cells and also to note the numbers of squamous epithelial cells in the sample.

Aerobic Culture: The discharge was used for inoculation on blood agar, nutrient agar and Mac Conkey agar plates. All plates were incubated aerobically at 37°C and evaluated at 24 hours, 48 hours and 72 hours and the plates were discarded if there was no growth. The specific identification of bacterial pathogens was done based on microscopic morphology, staining characteristics, cultural and biochemical properties using standard laboratory procedures. Antimicrobial susceptibility of the bacterial isolates to the commonly used antibiotics was done by Kirby-Bauer disc effusion method. The strength of the antibiotics used were:

- A-10 µg.
- Ak-30 µg.
- Cb-100 µg.
- Ce-30 µg.
- Cf-5 µg.
- Co-25 µg.
- E-15 µg.
- G-10 µg.
- Of-5 µg.
- Pb-300 units.
- Ci-30mg.
- Cs-75 µg.

RESULTS AND DISCUSSIONS

Total number of male patients who is having active CSOM is 22 (44%), female having active CSOM is 28 (56%).

Table 1: Showing Types of Organisms Found in Ear Discharge

Organisms	Number of discharge	Percentage
P.aeruginosa	23	41.07
S. aureus	15	26.79
Klebsiella	5	8.93
E. Coli	3	5.36
Proteus	3	5.36
Acinetobacter	1	1.79
No growth	5	8.93
Commensal	1	1.79
Total	56	100

Some patients had more than one ear discharge which was taken separately for bacterial analysis where we found that P. aeruginosa was the commonest bacterial infection (41.07%) among the patients. Second most common organism is S. Aureus (26.79%), Acinetobacter was minimum (1.79%) among the bacterias. It is interesting to know that around 8% didn't have any pathological bacteria in the discharge.

Table 2: Showing Type of Organisms vs Type of CSOM

Bacteria	Tubo-tympanic disease	Percentage disease	Attico-antral	Percentage
P. aeruginosa	17	42.5	6	42.86
S. aureus	11	27.5	4	28.57
Klebsiella	3	7.5	2	14.29
Acinetobacter	0	0	1	7.14
Proteus	3	7.5	0	0.00
E. coli	1	2.5	0	0.00
Commensal	1	2.5	0	0.00
No growth	4	10	1	7.14
Total	40	100	14	100

Majority of the infection among the study patients had tubo-tympanic disease (71.42%) compared to Attico-antral disease (25). Majority of pseudomonas infection showed mucopurulent type of discharge (50%) followed by S. aureus (33.33%). Purulent discharge was common in Pseudomonas (37.5%) and S. Aureus (37.5%). Mucoid discharge was common in Klebsiella (16.67%) followed by pseudomonas (27.78%) infection. It is interesting to know that 100% of no

growth had mucoid discharge. Chi square was used to find the association between bacteria and discharge; and it was found not significant. Pseudomonas has maximum sensitivity to Cf (91.3%) and high sensitivity for G. (82.6), Ce (73.9%), Ak (65.2%). High resistance was found for Cu (34.7%) and Of (38.5%). S.aureus has high sensitivity for Ak (80%), high resistance was found for cotrimoxazole (Co) (46.6%). Klebsiella has high sensitivity to Cf and G. (both being 100%), also Ak and Ce had sensitivity (both being 80%). Moderate resistance was found for cephalixin (Cn) (40%). Acinetobacter has 100% sensitivity to Ak, Cf, G. High resistance to Cu. Proteus showed 100% sensitivity to Cf and G., high sensitivity to Ak and Ce (66.6%). Resistance was found to Cn and Cu (33.3%). E. coli had 100% sensitivity to Ak, Cf, G. and high resistance to Cu.

Table 3: Comparison of Organisms vs Antibiotic Resistance

	Cu	Of	Co	Cn
Pseudomonas	8 (34.7 %)	6 (26.08%)	0 (0%)	0 (0%)
S. aureus	0 (0%)	0 (0%)	7 (46.6%)	0 (0%)
Klebsiella	0 (0%)	0 (0%)	0 (0%)	2 (40%)
E.coli	0 (0%)	1 (33.3%)	1 (33.3%)	0 (0%)
Proteus	1 (33.3%)	0 (0%)	0 (0%)	1 (33.3%)
Acinetobacter	1 (100%)	0 (0%)	0 (0%)	0 (0%)

Due to changing pattern of bacteriological profile of otitis media and sensitivity of microorganisms towards antibiotics, it has become very important to find out the organism causing the disease^[3]. In the present study the prevalence of CSOM was higher in the age group of 21-30 years (23.2%), followed by 11-20 years (17.8%). According to study of Poorey V.K., Iyer^[2] common age group was first and second decades of life, among them 1-10 years age group was more common (46%), which differ from our study. In 1998, Gupta Vineeta *et al.* found that maximum 52 patients (33.12%) patients were in the age group of 21-30 years, which correlates to our present study^[3]. Prakash *et al.* in their study has reported peak incidence in the first decade of life. In the present study the disease was more prevalent in the poor socio-economic group as compared to the other groups in the society. In the present series of 56 ears of CSOM, we found that P.aeruginosa 23 (41.07%) was the commonest organism followed by S. aureus 15 (26.79%), Klebsiella 5 (8.93%), E. Coli 3 (5.36%), Proteus 3 (5.3%) and Acinetobacter 1 (1.79%). No growth was found in 5 (8.9%) and commensal in 1 (1.8%). In the study by Gupta V, Gupta A, Sivarajan K3, in June 1998, S. aureus was commonest organism (30.73%), followed by P. aeruginosa (27.60%) and klebsiella (9.90%), which differ from the present study. In the present study, majority of the infection among the study patients was the tubotympanic disease (71.42%). It has been seen

that both Gram positive and Gram negative organisms are responsible for infection of middle ear. It is usually seen that the Gram negative organisms outnumber the Gram positive organisms in CSOM. In the present study, majority of the organisms were Gram negative (60.7%). Among the Gram negative organisms, *Pseudomonas* was the predominant organism followed by *Klebsiella*. This goes in favour of the study by Poorey^[2] where *Pseudomonas* was the predominant organism followed by *Klebsiella*. In the present study, majority of *Pseudomonas* infection (50%), *S.aureus* (33.3%) showed mucopurulent type of discharge. Mucoid discharge was common in and *Pseudomonas* (27%), *Klebsiella* (16.67%). In our series 100% of no growth had mucoid discharge. In the present study, *Pseudomonas* was highly sensitive to Cf (91.3%) and G. (82.6%), followed by Ce (73.9%), Ak (65.2%), *Pseudomonas* showed maximum resistance to Cu (34.7%) followed by of (26.08%). In our study *Klebsiella* showed high sensitivity to Cf and G. (both being 100%), followed by Ak and Ce (both being 80%). Moderate resistance was found for Cn (40%). In our study, *Acinetobacter* had 50% sensitivity to Ak, Cf, G. and Ce. It showed 100% resistance to Cu. *Proteus* species 100% sensitivity to Cf and G. High sensitivity to Ak, Ce (66.7%). Resistance was found to Cu and Cn (33.3%). *Klebsiella* spp., coagulase-negative *Staphylococcus*, *Proteus* spp. and *Escherichia coli*. Fungus was isolated in tubotympanic (9.45%) CSOM only. Among anaerobic isolates, *Peptostreptococcus* (1%) was most common which differs from our study.

CONCLUSIONS

- Cf was the most effective antibiotic followed by Ak, G, Ce.
- In both TTD, AAD, No anaerobic organisms were cultured.
- In the present era of antibiotics, the emergence of antibiotic resistance is becoming more common. The most important factor responsible for the development of antibiotic resistance is human negligence. As soon as, symptoms subside, patients stop taking antibiotics before completion of therapy and allow partially resistant microbes to flourish. Such practice should be discouraged and patients should be educated to avoid the same.
- So it becomes very important that each case of CSOM should be studied bacteriologically so as to prevent administration of unwanted antibiotics. This certainly will help in achieving dry ear and preventing complications.

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