



An observational study of Microbial profile of patients with Chronic Suppurative Otitis Media (CSOM): A hospital based study

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ABSTRACT

Objective: Our study was to evaluate microbial profile of the patients with Chronic Suppurative Otitis Media (CSOM).

Methodology: A detail assessment and clinical examination were taken to all 100 subjects. Single use Mini-tip Culture swabs were used to harvest the middle ear microflora through the tympanic membrane perforation. Much care was taken to avoid surface contamination and the swabs were transported to the microbiology department of the hospital for culture and sensitivity testing.

Results: Data was analyzed by using simple statistical methods with the help of MS-Office software.

Conclusions: Active CSOM is more affected in younger age group. And most causative organisms of active CSOM are Methicillin sensitive *Staphylococcus aureus* (MSSA)

Keywords: Chronic Suppurative Otitis Media (CSOM), Microbial profile.

Introduction

Chronic suppurative otitis media (CSOM) is a common public health problem worldwide and a major cause of hearing impairment in developing countries. The disease and its associated problems constitute a hidden disability.^[1]

Chronic suppurative otitis media (CSOM) is defined as chronic inflammation of middle ear and mastoid cavity that may present with recurrent ear discharges or otorrhoea through a tympanic perforation.^[2] Incidence of this disease is higher in developing countries especially among low socio-

economic society because of malnutrition, overcrowding, poor hygiene, inadequate health care, and recurrent upper respiratory tract infection.^[3] The urban to rural ratio of the disease is 1:2 and the poorer rural communities have highest prevalence.^[3,4]

CSOM is usually classified into two types, tubotympanic and attico-antral depending on whether the disease process affects the pars tensa or pars flaccida of the tympanic membrane (TM).^[3] Tubotympanic is called as a safe type or benign type as there is no serious complication

whereas, attico-antral is called as the unsafe or dangerous type because of associated complication and may be life threatening at times.^[5] Infection can spread from middle-ear to vital structures such as mastoid, facial nerve, labyrinth, lateral sinus, meninges and brain leading to mastoid abscess, facial nerve, paralysis, deafness, lateral sinus thrombosis, meningitis and intracranial abscess.^[6,7] Of all the complications, hearing loss associated with chronic ear discharge is nearly always significant, reported in 50% of cases and tending to be more severe than those reported in other types of otitis media.^[8] Complications associated with CSOM were frequent in pre-antibiotic era, however, the introduction of antibiotics gave clinicians a tool to be used even without the precise etiological diagnosis and the irrational use of antibiotics led to the emergence of multi-drug resistant bacterial strains and disease complication in return.^[9] Changes in bacterial flora in CSOM in the last decade have been confirmed and described by various authors.^[9,10]

The treatment of CSOM is controversial and subject to change particularly in the developing countries, the prevalence and antibiogram of these organisms has been reported to vary with time and geographical area as well as continent to continent, probably due to indiscriminate use of the antibiotics.^[9] Hence, the periodic update of prevalence and antibiogram of the etiological agents for CSOM would be helpful in therapy and management of patients.

Objective of our study was to evaluate the microbial profile (aerobic and anaerobic) of patients with active CSOM in department of ENT, VIMS, Pawapuri, Bihar.

Methods

A total of 100 patients (60 males, 40 females) with age group 01 to 50 years, associated with clinical history of Chronic Suppurative Otitis Media (CSOM) were included in this study. The entire subjects/attendants signed an informed consent approved by institutional ethical

committee of Vardhaman Institute of Medical Science, Pawapuri, Bihar, India was sought. Data was collected on the basis of inclusion and exclusion criteria, with irrespective of sex in OPD or the ward, of department of Ear Nose and Throat, VIMS, Pawapuri, Bihar during period of March 2016 to December 2016.

All our patients had perforated tympanic membranes with active purulent discharge. Detailed clinical history regarding age, sex, duration of discharge and antibiotic treatment was taken. Only patients who had not received antibiotic therapy (topical or systemic) for the previous 5 days were included in the study. Single use Mini-tip Culture swabs were used to harvest the middle ear microflora through the tympanic membrane perforation. Much care was taken to avoid surface contamination and the swabs were transported to the microbiology department of the hospital for culture and sensitivity testing. A total of 100 swabs were taken from 100 patients, processed aerobically and anaerobically for the isolation of aerobic and anaerobic bacteria, using standard microbiological procedures. All organisms isolated were identified according to standard microbiological methods.

Statistical Analysis

Data was analyzed by using of simple statistical method with the help of MS-Office software.

Results

This present study was carried out in department of Ear Nose and Throat, VIMS Pawapuri, Bihar. A total of 100 patients (60 males & 40 females) with irrespective of sex were taken.

In this study, 2(2%) patients were in group of 0-10 years. 29(29%) patients were in age group of 11-20 years. 40(40%) patients were in age group of 21-30 years. 5(5%) patients were in age group of 31-40 years. 24(24%) patients were in age group of 41-50 years. Majority of patients with CSOM were belonged in age group of 21-30 years.

Table.1. Age and percentage of patients with CSOM

Age group(Years)	0-10	11-20	21-30	31-40	41-50	Total
No. of patients	2	29	40	5	24	100
Percentage	2	29	40	5	24	100

When Single use Mini-tip Culture swabs were used to harvest the middle ear microflora through the tympanic membrane perforation in the microbiology department of the hospital for culture,

Many causative organisms were isolated, 46(46%) patients were affected by Methicillin sensitive Staphylococcus aureus (MSSA). 12(12%) patients were affected by Methicillin Resistant Staphylococcus aureus (MRSA), 5(5%) patients were affected by Coagulase _ve Staph.

That is 63(63%) patients with CSOM were affected by gram positive organisms.

18(18%) patients were affected by Pseudomonas aeruginosa, 4(4%) patients were affected by Proteus mirabilis. 3(3%) patients were affected by E. coli. 2(2%) patients were affected by Citrobacter Spp. 1(1%) patients was affected by Bacteroids spp. Total 28(28%) patients were affected by gram negative organisms. And 9(9%) patients had no isolation of these organisms. Majority of patients with CSOM were affected by gram positive organism Methicillin sensitive Staphylococcus aureus (MSSA).

Table. 2. Percentages of causative organisms of patients with CSOM.

Organism	Number	Percentage
Gram positive		
Staph aureus(MSSA)	46	46
Staph. aureus (MRSA)	12	12
Coagulase _ve Staph.	5	5
Gram Negative	28	28
Pseudomonas aeruginosa	18	18
Proteus mirabilis	4	4
E. coli	3	3
Citrobacter Spp.	2	2
Anaerobe		
Bacteroids spp.	1	1
No growth	9	9
Total	100	100

Discussion

This cross sectional study was carried out in the department of Ear Nose and Throat, VIMS, Pawapuri, Bihar. Chronic suppurative otitis media is a persistent inflammation of the middle ear or mastoid cavity, and is characterized by recurrent or persistent ear discharge through a perforation of the tympanic membrane.^[11] 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. Chronic suppurative otitis media is a common and potentially dangerous clinical condition that is difficult to treat because the most common infecting organisms are often resistant to many antibiotics.^[12] 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.^[13,14] 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 treatment of this condition can be medical; with therapy directed at eradicating pathogenic aerobic and anaerobic organisms.^[15]

Our study shown male patients were more affected with CSOM than female patients. Maximum number of patients (40%) which affected with CSOM were in age group of 21-30 years. Minimum number of patients (1%) were in age group of 0 to 10 years.

When Single use Mini-tip Culture swabs were used to harvest the middle ear microflora through the tympanic membrane perforation, and the swabs were transported to the microbiology department of the hospital for culture and sensitivity testing. We were found that maximum number of patients (46%) were affected by gram positive organism Methicillin sensitive Staphylococcus aureus (MSSA). And minimum number of

patients (1%) were affected by gram negative organism *Bacteroids* species.

Thus, our study showed that active CSOM infection mainly due to *S. aureus*, *P. aeruginosa* followed by *P. mirabilis*. Similar findings had been reported by Gehanno.^[12] *S. aureus* (MSSA) was the commonest organism isolated, although various such studies in different countries have shown *P. aeruginosa* to be more common.^[16]

Future Research

Science is dynamic and there is always a scope of improvement and change in time to come ahead. With progressive aim to move ahead we aspire to achieve highly accurate and reliable results. Thus every study leaves back scopes for other researcher to do something more advanced and varied in order to touch the height of perfection. This study examined only 100 subjects (60 males and 40 females), future researchers can expand the study by including more number of subjects so as to make generalization of the results and practice, further studies with a larger sample size and in multiple centers are required. Thus it could be applied to real life situation.

Limitation

There were several limitations like, the sample size was small, and it was a hospital-based study, the instrumentations and investigations may be different from a different health setup.

Conclusions:

We concluded that active CSOM infection were mainly occur due to Methicillin sensitive *Staphylococcus aureus* (MSSA), *Pseudomonas aeruginosa* and Methicillin Resistant *Staphylococcus aureus* (MRSA). And younger age group peoples were more affected with Chronic Suuppurative Otitis Media(CSOM)..

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