

Etiological agents in Chronic Suppurative otitis Media

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Abstract

Introduction: Chronic suppurative otitis media is an important cause of preventable hearing loss, particularly in the developing world. It is characterized by recurrent discharge from middle ear cavity through perforated tympanic membrane. Prevalence varies from eastern world when compare with western hemisphere. Most of the organisms are resistant to various antibiotics. We have conducted this study to identify etiologic organism. **Methods:** This study was a case control analysis study conducted in tertiary care teaching hospital of Central India after taking permission from Institutional Research board [IRB]. Total duration of study was 2 years. 216 patient's patients who came to OPD or admitted in hospital for chronic ear discharge & full fill inclusion criteria have been included in study. **Results:** Out of 216 patients 119 (55 %) were male & 97 (45 %) were female. Staphylococcus (25 %, n= 55) & Pseudomonas (26 %, n= 56) together were two most common organisms comprised nearly fifty percent of total patients. Nearly 30 % of culture did not reveal any growth. Candida was most common fungus on culture comprised nearly 7 % of total population. **Conclusion:** Sensitivity pattern varies with geographical areas but most of the organisms are sensitive with ciprofloxacin ear drops. It is consider first line of drugs for CSOM.

Key words: Chronic suppurative otitis media, Etiology, Culture & sensitivity pattern

Introduction

Chronic suppurative otitis media (CSOM) is the result of an initial episode of acute otitis media and is characterized by a persistent discharge from the middle ear through a tympanic perforation. It is an important cause of preventable hearing loss, particularly in the developing world [1].

Prevalence surveys, which vary widely in disease definition, sampling methods, and methodologic quality, show that the global burden of illness from CSOM involves 65–330 million individuals with draining ears, 60% of whom (39–200 million) suffer from significant hearing impairment. CSOM accounts for 28,000 deaths and a disease burden of over 2 million DALYs. Over 90% of the burden is borne by countries in the South-east Asia and Western Pacific regions, Africa, and several ethnic minorities in the Pacific rim. CSOM is uncommon in the Americas, Europe, the Middle East, and Australia [1]. A systematic review has shown that chronic suppurative otitis media incidence rate is 4.76% i.e.

31 million cases, with 22.6% of cases occurring annually in under-fives. CSOM is also responsible for 30.81/ thousand hearing loss each year [2]. Each year 21 thousand people die due to complications of OM [2].

Frequent upper respiratory tract infection, Low socioeconomic status, Poor hygiene, undernutrition are associated with CSOM [3-5]. Some studies have shown relationship between maternal education, bathing habits, ear cleaning habits [6]. Disease prevalence was also found higher among the dwellers of kachha house [6].

High prevalence of CSOM is associated with inadequate breast feeding, poor hygiene, overcrowding, passive smoking, recurrent Respiratory tract infection, impaired immune response, colonization of nasopharynx by pathogenic organism and Non availability of health care facilities [1]. Recurrent Chronic suppurative otitis media is most common reason responsible for hearing loss [1,7]. Cholesteatoma, mastoid abscess, labyrinthitis, facial nerve palsy, benzold's abscess, brain abscess, sinus abscess, meningitis are other known complication of CSOM [8-11].

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Chronic suppurative otitis media is chronic discharging ear is one with a perforated tympanic membrane and persistent drainage from the middle ear. Unlike otitis media with effusion which is common in the West and associated with serous discharge instead of purulent [12,13].

Management of CSOM is daily ear dressing till dry ear is achieved with antibiotic drops [14, 15]. In complicated cases mastoidectomy should be done [15].

Bacteriological profile of Acute suppurative otitis media is different than CSOM. Acute suppurative otitis media is caused by respiratory organism like *Streptococcus pneumoniae*, *Staphylococcus aureus*, *Haemophilus influenzae* and *Micrococcus catarrhalis*. These organisms are commonly present in nasopharynx & can reach to middle ear during respiratory tract infections [1].

Chronic suppurative otitis media is commonly caused by aerobic (e.g. *Pseudomonas aeruginosa*, *Escherichia coli*, *S. aureus*, *Streptococcus pyogenes*, *Proteus mirabilis*, *Klebsiella* species) or anaerobic (e.g. Bacteroides, Peptostreptococcus, Propionibacterium) [16, 17]. These organisms are commonly present in external ear canal. They can reach to middle ear cavity in tropical conditions like humidity, high temperature, trauma, laceration in presence of middle ear perforated canal [1, 17].

Among these bacteria, *P. aeruginosa* has been particularly blamed for the deep-seated and progressive destruction of middle ear and mastoid structures through its toxins and Enzymes [1].

Ear discharge is most common problem for Ear, Nose & throat outpatient department visit. CSOM is major burden in society. Identification of etiological organism is not only important for diagnosis purpose but also aid in advising patients regarding prognosis & complications. Few aetiological agents are more common in healthcare settings; the healthcare institutions can take appropriate sterilization practices to prevent further spread.

Therefore we have conducted this study to identify etiological agent (Bacteria, Fungus) and risk factor for CSOM.

Methods

Study design

This study was a case control analysis study conducted in tertiary care teaching hospital of Central India after taking permission from Institutional Research board

[IRB]. Total duration of study was 2 years. All the patients who came to OPD or admitted in Hospital for chronic ear discharge & full fill inclusion criteria have been included in study.

Patients

All in patients who presented to the ENT Department during the study period and had ear discharge of more than six weeks duration despite out-patient treatment were included in the study.

Exclusion criteria

1. Acute suppurative otitis media (Ear discharge less than 6 weeks)
2. Serous otitis media
3. Otitis externa with CSOM
4. Terminally ill patients
5. Evidences of septicaemia in patients
6. Patients not willing to participate in study
7. Immunocompromised patients

Collection of Samples

Samples were collected from patients before administering any antibiotics drops. History was obtained about any recent drug administration in the ears.

Specimens for pus culture were collected, under illumination, by swabbing the discharging ears with a sterile cotton swab and sent to the microbiology laboratory of the hospital immediately.

Samples collected were inoculated in nutrient agar and Mackonkey medium and incubated for 24 to 48 h at 37C. On visible growth of bacterial colonies, microscopic and various chemical and enzymatic tests were conducted to identify the bacteria. Antibiotics sensitivity testing was done for commonly available drugs.

Data Analysis

All data collected were entered into the Statistical Package for Scientific Studies (SPSS) version 17.0 and standard deviations (SD), standard errors (SE), standard normal deviates (SND) and probability values were calculated.

Results

During study period 296 patients came with history of ear discharge. 216 patients were full filled inclusion criteria and included for further analysis.

Out of 216 patients 119 (55 %) were male & 97 (45 %) were female (Fig 1). Most of the patients (78 %) belong

to lower socioeconomic strata as per modified Prasad classification. Most of the patients were young (below 30 years of the age). Children below 10 years comprised a significant proportion (17 %). (Fig 2)

Table 3 is showing culture pattern after sterile ear swab sampling. We have excluded patients who have taken medication in form of ear drops before sampling. Staphylococcus (25 %, n= 55) & Pseudomonas (26 %, n= 56) together were two most common organisms

comprised nearly fifty percent of total patients. Nearly 30 % of culture did not reveal any growth. Candida was most common fungus on culture comprised nearly 7 % of total population.

On statistical analysis there was no significant association between demographic factors & CSOM. There was no significant association between age & CSOM (p > 0.5). However CSOM was less common in females & elderly age group.

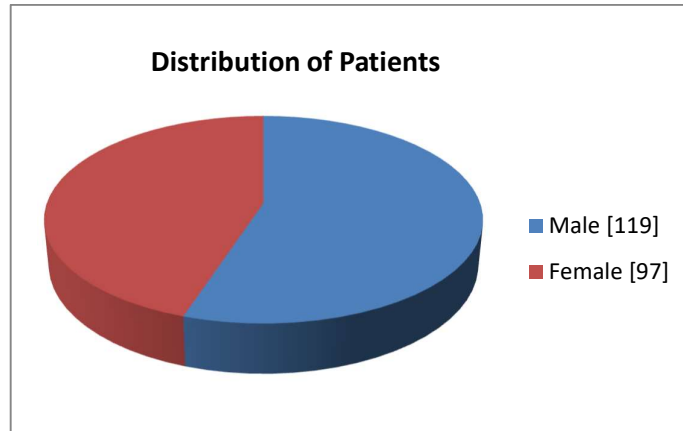


Fig 1: Pie chart showing male & Female Distribution

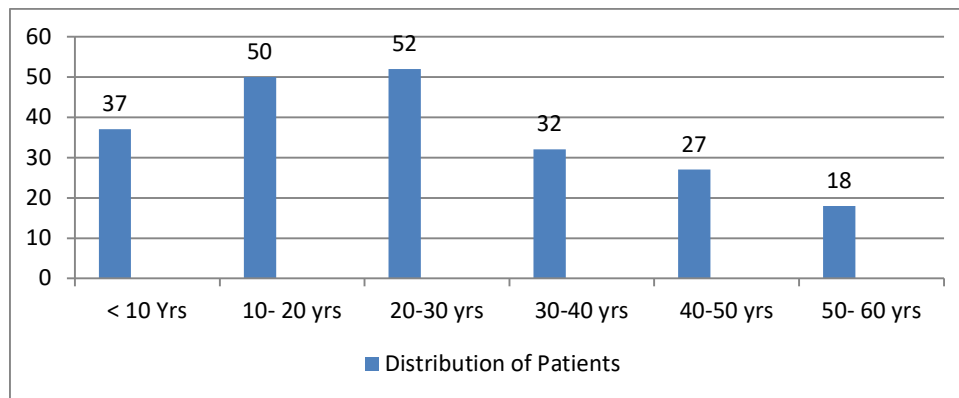


Fig 2: Distribution of patients in different age group

Table No 1: Culture growth of various organism

Sr No	Organism growth	Number of patients
1	Coliforms	20
2	Staphylococcus	55
3	Pseudomonas	54
4	Enterococcus	8
5	Candida	15
6	No growth	64

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Chronic suppurative otitis media is defined as recurrent ear discharge from ear from permanent perforation which does not heal spontaneously.

Demographic observation revealed male predominance with male to female ratio 1.25: 1. It was not statistically significant. Most of the other studies observed male predominance [18, 19]. It may be due to skewed male to female ratio. Another explanation is males normally seek medical attention first than females.

Children below 10 years comprised almost one fourth of total culture positive patients. Predominance of CSOM is also observed in other studies [20, 21]. Children are more prone because of malnutrition, recurrent upper respiratory tract infection & altered immune status.

In our study common organism includes Pseudomonas, Staphylococcus, Coliforms & Candida. Other studies from tropical area have observed Pseudomonas & Staphylococcus together as most common organism [17, 18].

In our study these two organisms comprised nearly 50 percent of culture positive population. One more study from tropical countries has observed 44 % culture positive Staphylococcus & 39 % Pseudomonas in their study. Together they comprised nearly 83 % of total cases which is higher than what we have observed in our study [21].

Bacteriological pattern also varies with demographic area [22]. One of the African study has observed Proteus as most common organism followed by Pseudomonas & Staphylococcus [23].

In our study it was evident that nearly 20 % of patients did not yield any organism. Prior antibiotics use before culture sample, improper technique & delayed sending of swab culture in slow resolving CSOM would be contributory factors.

In our study sensitivity pattern was assessed for ciprofloxacin, Gentamycin, tobramycin & erythromycin. Almost 90 % of organisms were sensitive for ciprofloxacin.

Most of the Pseudomonas & Staphylococcus were sensitive for quinolones. Sensitivity pattern with other antibiotics were variable. Other studies have also shown good sensitivity pattern with quinolones [18, 24, 25, 26].

Ciprofloxacin drops can be considered first line drugs for most of CSOM cases. Most of the Pseudomonas organisms with others are sensitive with ciprofloxacin. Now there are emergences of new bacteria which are resistant to quinolones from Asian countries [27].

Conclusion

Pseudomonas & Staphylococcus are two most common organisms responsible for chronic suppurative otitis media. Sensitivity pattern varies with geographical areas but most of the organisms are sensitive with ciprofloxacin ear drops. They are considered first line of drugs for CSOM.

We have not observed any statistically significant association between age & sex with CSOM but it is more common in children & adolescents. Elderly population & females are less affected.

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