ORIGINAL RESEARCH PAPER

Volume-8 | Issue-3 | March-2019 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

INCIDENCE OF PSEUDOMONAS AND STAPHYLOCOCCUS IN CHRONIC SUPPURATIVE OTITIS MEDIA AND ITS RELATIONSHIP WITH SEVERITY OF THE DISEASE

ENT

Dr Sumit Sharma Associate Professor, Department of E.N.T., Mayo Institute of Medical Sciences, Gadia, Barabanki

Dr Haraprathap Yelishetty* Intern, Mayo Institute of Medical Sciences, Gadia, Barabanki *Corresponding Author

KEYWORDS

Pseudomonas, Staphylococcus, Chronic Suppurative Otitis Media and Severity.

INTRODUCTION

Chronic suppurative otitis media (CSOM) is a chronic inflammation of the middle ear cleft characterised by ear discharge from a permanent perforation in the tympanic membrane.

It has been classified into two types tubo-tympanic and attico-antral type depending upon whether the pars tensa is involved (former) or pars flaccida is involved (later). The perforations of pars tensa are again of two types - 1. Central and 2. Marginal. The central tubo-tympanic perforations are considered as safe as they are usually not encountered with life threatening complications whereas marginal perforations of pars tensa and attic perforations are considered as dangerous as they are often associated with life threatening complications.

The disease is more common in developing countries especially among low socio-economic society because of malnutrition, overcrowding, poor hygiene, inadequate health care, and recurrent upper respiratory tract infection. The urban to rural ratio of the disease is 1:2 and the poorer rural communities have highest prevalence (1).

With the advent of newer antibiotics the complication rates in CSOM has drastically come down but has lead to another problem due to indiscriminate use of antibiotics-that of multi drug resistant bacterial strains and disease complications in return. Changes in bacterial flora in CSOM in the last decade have been confirmed and described by various authors (2).

Since disease is more common in children educating the parents is an important criterion in reducing the disease occurrence as well as reducing the complications associated with it

We hope that the data in our study will help understand the bacteriological flora in both safe and unsafe type of Chronic Suppurative Otitis Media, as not many studies were found to have done that.

OBJECTIVES

1. To study the bacteriological flora of Chronic suppurative otitis media
2. To see the incidence of Pseudomonas and Staphylococcus in Chronic Suppurative Otitis Media
3. To see the Relationship of Pseudomonas with Severity of Chronic Suppurative Otitis Media
4. To see the Relationship of Staphylococcus with Severity of Chronic Suppurative Otitis Media

METHODS:

Study design: Cross-sectional, prospective, and observational
Study population: Safe & unsafe type of CSOM patients
Sample size: 172 Patients
Sample collection: Standard method of collection of ear swab
Statistical analysis: As per standard norms

Selection criteria

Inclusion criteria

1. CSOM patients of all age groups
2. Pus collected from both unilateral and bilateral discharging ears
3. Patients who have not taken any antibiotics either topical or systemic for the last 7 days

Exclusion criteria

1. Post-operative discharging cavities were excluded from study.
2. non cooperative patients were excluded from the study
3. Patients who have taken any antibiotics either topical or systemic in the last 7 days.

DATA COLLECTION

After proper enrolment of subjects, information was noted in a preformed questionnaire which includes identification, demographic details, medical history, and physical examination.

Sample collection

Aseptic microsurgical techniques were observed in the collection of specimens.

1) Each tympanic membrane was adequately visualized
2) A sterile cotton pledget soaked in povidone-iodine (Betadine™) was swabbed 3 times around the external auditory canal (EAC)
3) A sterile cotton swab soaked in 70% ethyl alcohol was likewise applied thrice around the EAC
4) A sterile, dry micro-cotton swab was applied to the fluid draining from the tympanic membrane (TM) avoiding contact with the EAC walls.

Each specimen bottle was labeled with the patient's name and ear laterality and submitted for direct culture for aerobes and sensitivity studies at the Department of Laboratories within 15 minutes of collection. Direct culture material was seeded onto sheep blood agar and chocolate agar plates, incubated in the presence of oxygen for 24 hours at 37o C and subjected to automated bacterial identification. Isolates yielding pure cultures were further studied for antimicrobial sensitivity and resistance, using drugs chosen from commonly prescribed medications for patients with CSOM in our institution. This study was limited to identification of aerobic bacterial isolates from the samples submitted for culture.

A separate swab will be used and the procedure will be repeated on other ear Specimens will be transported to the laboratory immediately where it will be cultured in the Microbiology department.

SAMPLE PROCESSING

The culture of the bacteria was done either by nutrient agar or by blood agar. The process employed was streak plate culture.

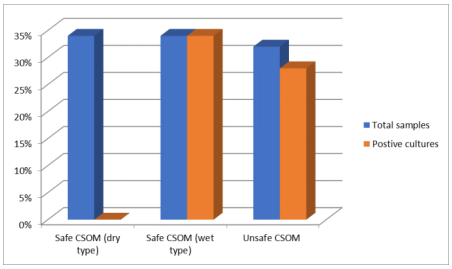
ETHICAL CONSIDERATION

The proposed study has been cleared by the institutional ethical committee.

OBSERVATIONS

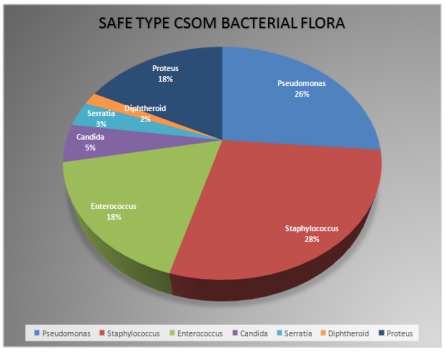
Samples collected from 172 patients of Chronic Suppurative Otitis Media (CSOM) comprised of 58 samples of safe (dry type), 58 samples of safe (wet type), and 56 samples of unsafe (attico-antral type).

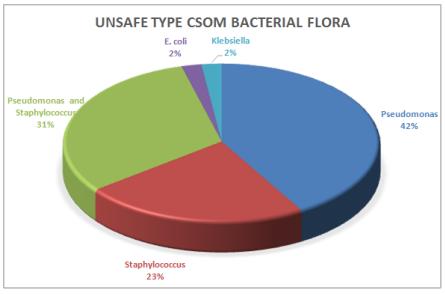
Among the total 172 samples collected, 34% were of safe(dry type- no secretions) had no growth on culture media after 24 hours Rest of the samples, 61.60%(n=106) showed growth on culture media after 24 hours of which 58 (54%) samples were of tubo-tympanic type (safe) and 48 (46%) were attico-antral type.



In patients of safe type of CSOM (n=58), Staphylococcus was most common organism isolated accounting for 27.50 %(n=16), followed by Pseudomonas was second most common organism isolated accounting 25.86%(n=15). Both Enterococcus species and Proteus accounts for 17.20 %(n=10) each, Candida was seen in 5.17 %(n=3), Serratia was seen in 3.40 %(n=2). One patient (1.72%) had Diphtheroid growth in the discharge.

In patients of unsafe type of CSOM (n=48), Pseudomonas was most common organism accounting for 41.60 %(n=20), followed by mixed growth of Staphylococcus and Pseudomonas accounting for 31.25 %(n=15), whereas Staphylococcus was seen in 22.91 %(n=11). One patient (2.08%) had E. coli in their discharge and one more patient with 2.08% of Klebsiella has been found in the discharge.





DISCUSSION

Chronic Suppurative Otitis Media (CSOM) is one of the commonest clinical entity encountered in ENT practice. Discharging ear along with varying degree of hearing impairment is one of the commonest complaints encountered in the disease. In the safe type of disease these are the common features but in the unsafe type it can lead to serious complications which can be intra temporal like- Vestibulitis, facial palsy, mastoiditis, mastoid abscess and intra temporal complications like meningitis and intracranial abscess hence it is important to recognize the bacteria present in the disease for proper antibiotic coverage and control the disease. CSOM is an important cause of preventable hearing loss particularly in the developing world (3) and a reason of serious concern, particularly in children, because it may have long term effects on early communications, language development, auditory processing, educational process, and physiological and cognitive development (4) The present series analysis the bacteriological profile in safe (dry as well as discharging) as well as unsafe type of Chronic Suppurative Otitis Media.

- A study conducted by Basavaraj et al (5), includes a total of 159 patients. This study did not classify the disease into safe and unsafe type, which showed 33.33% of Pseudomonas and 28.90% of Staphylococcus; this comparatively both of these growths have a little lesser percentage in our study whereas Proteus spp. has showed near similar growth in both the studies.
- Taking another study into consideration, conducted by Shyamala et al (6), taking 100 patients in a sample group Pseudomonas was predominant of 40%growth and Staphylococcus took the second place with 31% samples which implies the growth of microbes in their study had higher percentages when compared to our study.
- Khatoon A et al (7), undertook a study which shows Pseudomonas found to be 37.89% of the growth where Staphylococcus stood second to it and covered 32.63%of growths, shows gram negative bacterial growth (60.60%) far exceeded gram positive bacterial growth(with no categorization into safe and unsafe types) which shows our study had little lesser percentage of Staphylococcus of 23% and higher percentage of Pseudomonas of 42%(in unsafe type).
- Neha et al (8) found in their study that the most common organisms isolated was Staphylococcus aureus (39.82%) followed by Pseudomonas sp. (25.66%). Klebsiella pneumonia(10.61%), E.coli(9.14%), Coagulase negative Staphylococci(7.07%), Proteus(5.6%) and Enterococcus(2.0%) were the other organisms isolated, whereas in our study Pseudomonas sp. had higher incidence of 42% followed by Staphylococcus aureus had a lower incidence of 23% among unsafe type and Proteus had higher incidence of 17% in the safe type of CSOM.
- Suhail A Patigaroo et al(9) showed in their study along with categorization into safe and unsafe types of CSOM that the majority of patients with safe ears showed S. aureus (65 cases) growth on the culture, while the majority of patients with unsafe ears showed gram negative growths on the culture. The most common organism was *S. aureus* observed in 65% of patients followed by *Pseudomonas* in 13% and *Escherichia coli* in 7%, whereas in our study Staphylococcus was common and found in 28% of patients of safe type and Pseudomonas sp. was found in 42% of the patients in unsafe type of CSOM.
- Sowmya Tumkur Rangaiah et al (10)conducted a study on 135 patients with CSOM The most frequently isolated organism in this study was *Staphylococcus*; 43 out of 135 (31.8%) of which *Staphylococcus aureus* was 28/43 (65.11%), MRSA (Methicillin Resistant *Staphylococcus aureus*) were 6/43 (13.9%) and CONS (Coagulase Negative *Staphylococcus*) were 9/43 (20.9%). The second most common organism isolated was *Pseudomonas aeruginosa*; 42 out of135 (31.1%), whereas in our study Staphylococcus of 28% and Pseudomonas sp. of 26% among the safe type of CSOM were found.
- Deepthi Maringanti et al (11) in their study of 106 patients isolated MRSA(17%), MSSA(7%), CONS(6%), Pseudomonas (39%), and Klebsiella(15%), grossly comparing, we found near equal percentages of Pseudomonas of 42% in unsafe type of CSOM in our study .
- In the study conducted by Sibanarayan Rath et al (12) there were 1043 bacterial and 121 fungal isolates in total. The most common causal bacteria isolated were 220(21.09%) isolates of S. aureus with and 188(18.02%) isolates of P. aeruginosa;and 19 isolates of S. aureus were MRSA, and 64 isolates were coagulase negative S. aureus (CONS). Bacteria, P. aeruginosa was isolated in 183 of the total 1164 samples that yielded mixed colonies of S. aureus, Klebsiella sp. and Proteus sp., followed by Escherichia coli, but we obtained 28% of Staphylococcus and 26% of Pseudomonas in safe type of CSOM.
- In a study conducted by Sumit Sharma et al (13) of 150 samples, which were accordingly classified into safe (dry and wet type) and unsafe type, it was seen that both showed equal percentage of Staphylococcus and Pseudomonas of 24% in safe type(wet) and 22.22% of Staphyloccus and 44.44% of Pseudomonas aeruginosa among the culture positive samples of unsafe type of CSOM, which when compared, now in our present study we have higher percentage of 27.5% of Staphylococcus and 25.86% of Pseudomonas in safe type and lower percentage of 41.60% of Pseudomonas but more or less equal growth of 22.91% of staphylococcus in unsafe type and other microbes like Candida, Serratia, Enterococccus groups showed almost equal growth in both studies.

CONCLUSION

Chronic Suppurative Otitis Media like any other illness is associated with high morbidity and in some unsafe types can be fatal as well and must be treated with priority. Lack of awareness towards disease and lack of proper health-care availability especially in rural areas also adds to the morbidity and mortality Improper or inability to isolate the invested organism is a major reason of failure of conservative

treatment. The constant changing nature of bacteriological flora adds to the problem hence a periodic analysis of the flora is necessary for the proper treatment. Indiscriminate use of antibiotics especially without knowing the sensitivity adds to the problem of drug resistance

1. All the patients of dry type of safe CSOM were culture negative while 100% samples of wet type of safe CSOM showed growth. 85% of unsafe CSOM samples were culture positive.
2. In patients of safe type of CSOM (58), Staphylococcus was most common organism isolated followed by Pseudomonas. In patients of unsafe type of CSOM (48), Pseudomonas was most common organism followed by mixed growth of Staphylococcus and Pseudomonas, whereas Staphylococcus was third commonest.
3. Staphylococcus was seen in 28% of safe type and 23% in unsafe type of CSOM - indicating Staphylococcus to be related to the severity of the disease.
4. Pseudomonas was seen in 26% of safe type and 42 % in unsafe type of CSOM-indicating Pseudomonas to be directly related to the severity of the disease.
5. We suggest a study with greater number of patients to be done to see for the Incidence of Pseudomonas and Staphylococcus in Chronic Suppurative Otitis Media and its relationship with Severity of the disease.

REFERENCES

1. Kumar H, Seth S. Bacterial and fungal study of 100 cases of Chronic Suppurative Otitis Media. J Clin Diagn Res 2011;5:1224-7.
2. Microbiology of Chronic Suppurative Otitis Media in a tertiary care setup of Uttarakhand state, India: by Rajat Prakash, Deepak Juyal, Vikrant Negi,Shekar Pal, Shamanth Adekhandi, Munesh Sharma, Neelam Sharma.
3. Berman S . Otitis media in developing countries. Pediatrics. 1995;96:126-31
4. AcuinJ. Geneva: World health organisation; 2004. Global burden of disease due to Chronic Suppurative Otitis Media: Disease, deafness, deaths and DALYs Chronic Suppurative Otitis Media-Burden of Illness and Management options; pp. 9-23.(Accessed August 29, 2012)
5. Chronic Suppurative Otitis Media (CSOM) Etiological agents and antibiotic sensitivity pattern of isolates; by METRI BASAVARAJ C, P JYOTHI
6. The incidence of sensitivity pattern is Staphylococcus aureus in CSOM in a tertiary care hospital in south India; by R SHYAMALA, P SREENIVASULU REDDY
7. Chronic Suppurative Otitis Media: a clinico-microbiological menace :by Abida Khatoon*,. Meher Rizvi, Asfia Sultan, Fatima Khan, Mohit Sharma, Indu Shukla, Haris M. Khan.
8. Bacterial flora of CSOM and their Antibiogram in RIMS, Ranchi-a tertiary care hospital; by Neha, Ashok Kumar Sharma, Manoj Kumar, Amber Prasad.
9. Drift in the bacteriology of Chronic Suppurative Otitis Media and methicillin resistant Staphylococcus aureus as an emerging pathogen:an experience ; by Suhail A Patigaroo, Shakeel M Wani, et al.
10. Bacteriological profile oof chronic suppurative otitis media in a tertiary care hospital; by Sowmya Tumkur Rangaiah, Ravi Dudda, M. Hanumanth Prasad et al.
11. Prevalence of Pseudomonas aeruginosa in CSOM at a tertiary care centre; Nalgonda, telangana; by Deepthi Maringanti, Ganapuram J. Archana.
12. Surveillance of bacteria Pseudomonas aeruginosa and MRSA associated with CSOM; by Sibanarayan Rath, Saumya Ranjan Das, Rabindra Nath Padhy.
13. Bacteriological Flora in the safe and unsafe types of chronic suppurative otitis media; Sumit SHARMA, Khalid ASHRAF.