Change in findings of culture and sensitivity data if any in chronic otitis media during COVID pandemic

[1]Raghvendra Singh Gaur, [2]Shammi Kumar Jain, [3]Sanjay Agrawal, [4]Dr. Swati Chandel

[1]Professor, ENT Department, BRLSABVM Medical College, Rajnandgaon, Chhattisgarh, India
[2]Assistant Professor, Department of Paediatrics, SRVS Medical College, Shivpuri, Madhya Pradesh, India
[3]Professor and Head, Department of ENT, NSCGMC, Khandwa, Madhya Pradesh, India
[4]Consultant Surgeon, ENT Centre, Rajnandgaon, Chhattisgarh, India

Corresponding Author:
Dr. Swati Chandel

Abstract

Background: Chronic otitis media is an important cause of morbidity affecting all ages leading to variety of complications which has major impact on the patients and more so in Covid pandemic. Study to see the change in findings of culture and sensitivity data in chronic Otitis media during Covid pandemic and hence modify the treatment plan.
Aims: To study the bacteriology associated with the chronic otitis media and study any change in findings of bacteriology of chronic otitis media during COVID pandemic.
Subjects and methods: The retrospective study was done. The culture and sensitivity data during Covid pandemic was collected from Jan 2020 to Jan 2021 from ENT centre and their analysis and interpretation done according to age, types of culture and their sensitivity.
Result: In the total 100 cases of culture and sensitivity results during pandemic, pseudomonas aeruginosa was the most common organism isolated and showed highest sensitivity towards piperacillin/tazobactam and polymyxin B. Staphylococcus aureus was second most common which showed highest sensitivity towards linezolid and teicoplanin. Both showed lowest sensitivity towards ciprofloxacin. There was no change found in the bacteriology culture during the Covid pandemic which was compared from available literature.
Conclusion: the change in the findings of culture and study of chronic otitis media based on the study done shows almost no difference with the pre-pandemic times. But high antibiotic resistance implicates the careful use of antibiotics in treatment and avoiding empirical method of treatment.

Keywords: Covid pandemic, CSOM, culture sensitivity, pseudomonas

Introduction

Chronic supportive Otitis media is a chronic infection of middle ear cleft with permanent perforation syndrome and is responsible for hearing impairments and sometimes deadly complication as middle ear is in vicinity of many crucial structures. The prevalence of chronic otitis media is 72 per thousand people [1].The global incidence being 4.76 per

thousand individuals [2]. CSOM is one of the commonest cause for morbidity in otology. Timely treatment has led to the reduction in complications related to the chronic otitis media thus improving quality of life. Covid pandemic led to the unavoidable delay which led to increased complications and use of empirical antibiotics and drug resistance. Thus, it is necessary to see the change in the findings in bacteriology before and during pandemic.

Subjects and Methods

This study was done in ENT Centre, Rajnandgaon and Chhattisgarh during the period from Jan 2020 to Jan 2021. This retrospective study was carried out in 100 patients and was found to be within ethical standards as the Helsinki Declaration was followed.

Collection of retrospective data was done from Jan 2020 to Jan 2021 at ENT centre of the patients who were diagnosed with CSOM with active ear discharge, all cases of safe as well as unsafe type of CSOM cases included in the study. The patients having active discharge from the ear taken for study and sample is taken in sterile manner with the help of sterile ear speculum and sterile swab stick. Specimen was sent for culture and sensitivity immediately. The patients were chosen such that they were not receiving any antibiotics prior to the test for at least one week. Organisms were identified in samples of CSOM cases during Covid pandemic were segregated as per age, their sex and organism isolated and its sensitivity to the antibiotics. Data interpretation was done with discussion of results.

Results

In the study, total of cases of 100 culture sensitivity data were included each during Covid pandemic. Out of this 59 were males and 41 females.
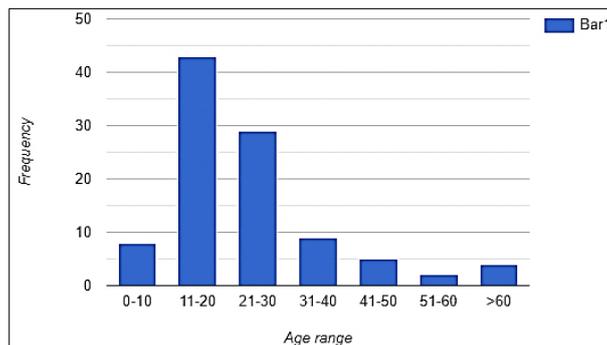
Table 1: Gender distribution

Gender	Number
Male	59
Female	41
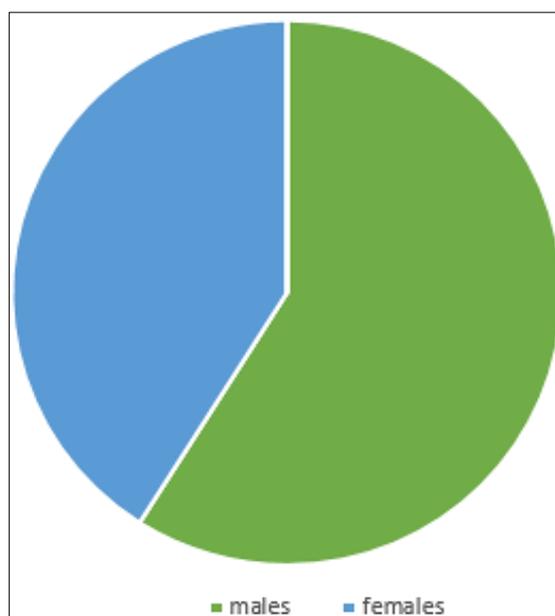
Fig 1: Gender distribution

Table 2: Age distribution

| Age Range	Frequency (%)
0-10	8 (7.9%)
11-20	43 (42.9%)
21-30	29(28.6%)
31-40	9(9.4%)
41-50	5(4.6%)
51-60	2(2.4%)
> 60	4(4.2%)

Fig 2: Age distribution

The age range was from 2 to 85 years. Highest number of cases were in 11 to 20 years age group 43(42.7%), and 29(28.6%) in the age group of 21-30.

Table 3: Organism found in the study

Organism	Number (%)
Gram negative	69 (68.6%)
Pseudomonas	52 (51.5%)
Proteus	5(5.0%)
Klebsiella	4(3.6%)
Acinetobacter	3(3.0%)
Morganella	1(1.2%)
E coli	4(4.1%)
Gram positive	31(31.4%)
Staph aureus	23(23.2%)
MRSA	4(4.1%)
S. epidermidis	4(4.3%)
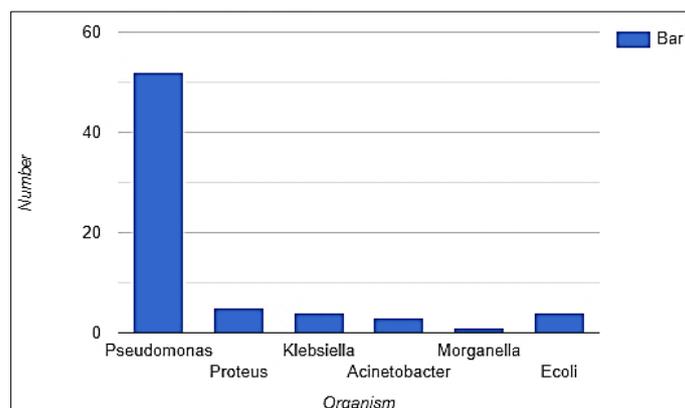
Fig 3: Gram Negative Organism
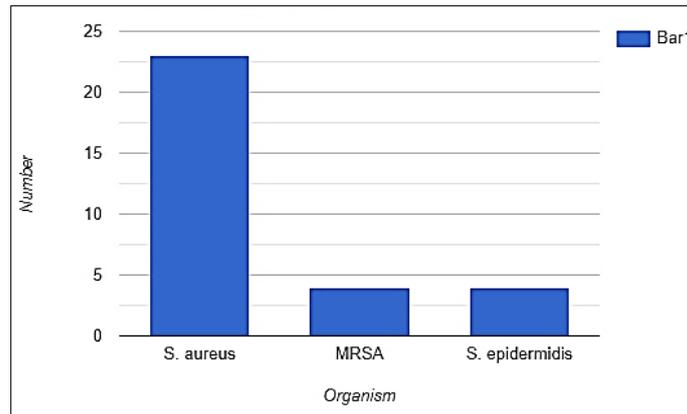
Fig 4: Gram Positive Organism

Pseudomonas aeruginosa was isolated from 52 (51.5%) samples making it the most common organism. Second most common was staphylococcus aureus isolated from 23 (23.2%) samples. The gram positive organism isolated from 31.4% samples and gram negative from 68.6%.

Table 4 depicts the organisms isolated in atticoantral disease with pseudomonas being highest followed by staph aureus then proteus and klebsiella and MRSA.

Table 4: Organism in atticoantral disease

Organism	Number
Pseudomonas	8
S.aureus	4
Klebsiella	1
Proteus	2
MRSA	1
Total	16

Table 5: Pseudomonas aeruginosa susceptibility and resistance

| Antibiotic class	Antibiotic	Susceptible	Resistant
Cephalosporins	Cefoperazone	47	5
Carbapenem	Meropenem	40	12
Penicillin	Piperacillin/tazobactam	52	0
Aminoglycosides	Amikacin	45	7
Fluoroquinolones	Ciprofloxacin	38	14
	Levofloxacin	35	17
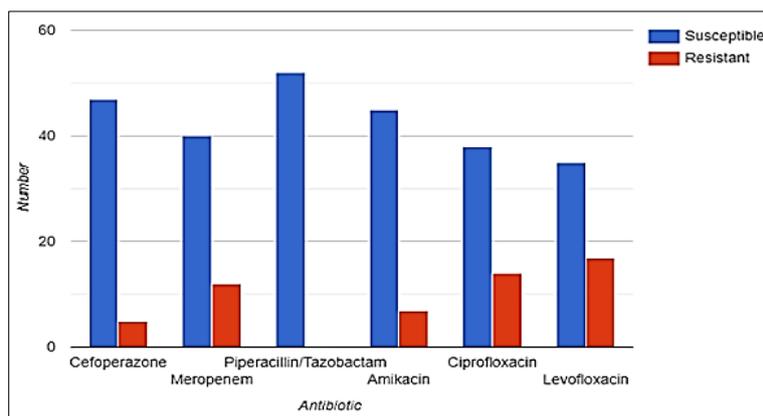
Fig 5: Pseudomonas aeruginosa susceptibility and resistance number 52

Table 5 depicts the susceptibility and resistance of pseudomonas to antibiotic classes. Isolated organism showed highest sensitivity to piperacillin (100%). Then next to cephalosporin (90.38%) and showed 86.53% sensitivity to aminoglycosides.

Table 6: Staphylococcus aureus susceptibility and resistance

Antibiotic class	Antibiotic	Susceptible	Resistant
Glycopeptides	Teicoplanin	22	1
Penicillin	Amoxicillin	7	16
Oxazolidinone	Linezolid	23	0
Fluoroquinolones	Ciprofloxacin	6	17
aminoglycosides	Amikacin	20	3
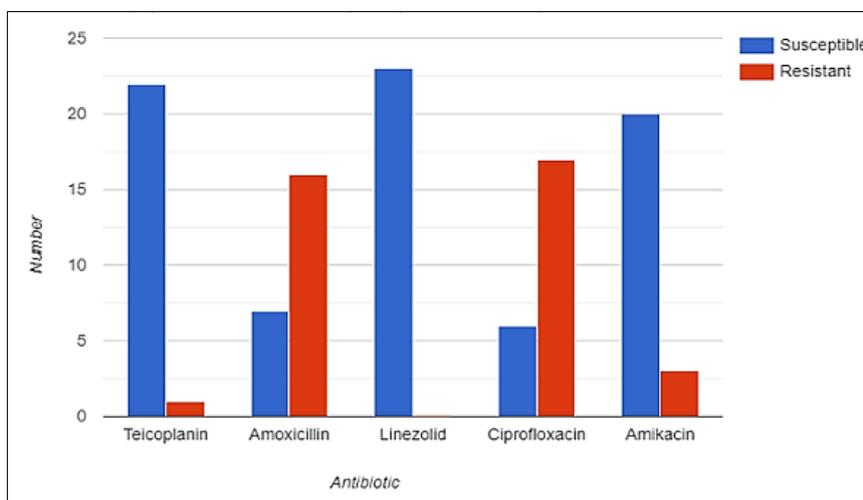
Fig 6: Staphylococcus aureus susceptibility and resistance pattern 23

Table 6: depicts susceptibility and resistance of staphylococcus to antibiotics. All the organisms showed 100% sensitivity towards linezolid. Followed by teicoplanin 95.6%, amikacin 86.9%, amoxicillin 30.4% and lowest to ciprofloxacin with 26.0%.

Discussion

India is a developing country in which poor socioeconomic status, low awareness for hygiene and health, unavailability of health personnel for timely adequate treatment which leads to prevalence rate of chronic otitis media high lending to hearing loss which is preventable cause of hearing impairment [1, 3]. CSOM unsafe type is associated with the more complication and increase in the cost of treatment.

In this study majority of patients were belonging to the younger population and fall in the age bracket of 11-20 years age, reasons may be multiple for which further study may be warranted. But as per few older studies recurrent URTI leads to recurrent ear discharge and development of CSOM [4].

In our study all sample were found positive for growth of bacteria, so ample positivity rate was 100 present compare other study [5]. In majority of cases in our study isolated organism were Pseudomonas and S. Aureus compare to commensally organism of External auditory canal [6]. Pseudomonas is biofilm producers which protect it from immune system and generally found in moist epithelium. In our study, Pseudomonas was the most common organism isolated, which is similar to many recent Indian studies [8, 9].

The sensitivity of pseudomonas in our study shows the similar results as of previous one with study by and Juyal *et al*. [9], which have piperacillin as the most sensitive antibiotic. It is a

surprising finding in our study that has shown a very low sensitivity toward ciprofloxacin. The probable reason for the emergence of resistance to this drug is indiscriminate use for any and every ear ailment, for the confirmation further study warranted for understanding.

S. aureus was the second most common organism isolated; it was widely sensitive to teicoplanin and linezolid, followed by amikacin. This is similar to studies by Samanth *et al*., [1] Shilpa *et al*., [5]. Earlier study by Taneja *et al*. showed a good sensitivity toward cefotaxime, amikacin, norfloxacin, netilmicin, and gentamicin [10]. This pattern has significantly changed in the present era and needs to be matched with loco regional culture and sensitivity patterns. In Indian scenario majority of ENT and general practitioner prescribe amoxicillin and systemic antibiotic and ciprofloxacin as ear drops to treat he any ear discharge without the culture reports. These cheaper available medicines for treatment of ear problems making them resistant to the bacteria.

Conclusion

According to the study the most common organism isolated is pseudomonas aeruginosa followed by staphylococcus aureus. The most effective antibiotic against pseudomonas was found to be piperacillin/ tazobactam> cefoperazone>amikacin. The most effective antibiotic in case of staphylococcus was found to be linezolid > teicoplanin>amoxicillin. This study does not show any change in bacteriology during Covid pandemic, still same bacterial flora is prevailing the CSOM case as before the starting of pandemic. Though this study also showed the widespread resistance of organisms towards certain group of antibiotics, emphasizing on the proper culture and sensitivity testing before the treatment to avoid the resistance in people. It implies careful use of antibiotics for treatment and prohibits unwanted resistance.

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