

A Study of The Bacteriological Profile of Chronic Suppurative Otitis Media In Tertiary Facility of Moinabad Belt (Rangareddy District, Telangana State, India)

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Abstract:

Introduction:

Chronic suppurative otitis media is one of the most common infectious disease worldwide. Also its known for its recurrence and persistence despite adequate treatment. It is caused by a wide variety of microorganisms, both aerobic and anerobic. To add on to it, there is emergence of specific antibiotic resistance due to inadvertent use of these drugs.

Aims And Objectives Of The Study: This study is a hospital based study aimed at re-evaluating the current bacteriological profile of chronic suppurative otitis media (CSOM) and the sensitivity pattern to most of the currently available antibiotics.

Patients And Methods: A total of 100 patients were selected presenting with actively discharging ear or ears to ENT OPD at Bhaskar Medical College/General Hospital, Yenkapally village, Rangareddy district covering 26 villages of moinabad belt. A sterile aural swab with pus was collected and sent for culture of the organism and antibiogram pattern to microbiology department of the same hospital.

Results: We analysed a total of 100 ear swabs ranging from age 1 year to 70 yrs. The most common organism isolated were gram negative organism and among that highest was pseudomonas aeruginosa (25%), followed very closely by Staphylococcus aureus (24%) and no organism isolated in 24% of the cases. The most effective antibiotic overall was found to be Ciprofloxacin in this study, followed closely by Amikacin, Gentamycin and Cefaperazone + sulbactam. Least sensitivity for drugs like Ampicillin and Amoxycillin+ Clavulanic acid.

Conclusions: The judicious use of antibiotics to prevent rapidly emerging resistance to various antibiotics and to prevent morbidity associated with the chronic discharging ear is the reason for knowing antibiogram before starting the treatment. Hence is the study done to know the etiology and antibacterial susceptibility of microorganisms would contribute to a rational antibiotic use and the success of treatment for chronic supportive otitis media.

Keywords: Antibiogram, Drug resistance, Chronic Suppurative Otitis media, Pseudomonas Aeroginosa, Staphylococcus aureus.

I. Introduction

Chronic suppurative otitis media is one of the most common infectious disease worldwide characterized by a permanent tympanic membrane perforation with persistant or recurrent ear discharge.^{1,2} It is the chronic inflammation of the middle ear cleft lasting for more than 6 weeks. It is basically divided into mucosal or tubotympanic disease or safe type and squamous or atticoantral disease or the unsafe type.^{3,4} The latter type is more commonly associated with complications, intracranial and extracranial. 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.^{5,6,7}

Bacteriology of CSOM can also be differentiated from AOM on bacteriological grounds. In AOM the bacteria found in the middle ear include Streptococcus pneumoniae, Staphylococcus aureus, Haemophilus influenzae and Micrococcus catarrhalis.^{8,9} These are respiratory pathogens that may have been insufflated from the nasopharynx into the middle ear through the Eustachian tube during bouts of upper respiratory infections. In CSOM the bacteria may be aerobic (e.g. Pseudomonas aeruginosa, Escherichia coli, S. aureus, Streptococcus pyogenes, Proteus mirabilis, Klebsiella species) or anaerobic (e.g. Bacteroides, Peptostreptococcus, Propionibacterium). The bacteria are infrequently found in the skin of the external canal, but may proliferate in the presence of trauma, inflammation, lacerations or high humidity.¹⁰ These bacteria may

then gain entry to the middle ear through a chronic perforation. 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. The knowledge of the prevalence of the organism and sensitivity to antibiotics of that organism and also availability of the antibiotics is very important for dispensing medical treatment for discharging ears. Hence, the periodic update of prevalence and antibiogram of the etiological agents for CSOM would be helpful in therapy and management of patients.^{11,12}

II. Materials And Methods:

This is a prospective type of hospital based study wherein a total of 100 clinically diagnosed patients with chronic suppurative otitis media in active stage of the disease were selected. This study included patients attending ENT OPD at Bhaskar Medical College/General Hospital, Yenkapally village in the Moinabadmandal, Telangana State covering the whole belt of moinabad which includes about 26 villages over 1 year period from Jan 2015 to Jan 2016.

Inclusion Criteria:

1. Chronic suppurative otitis media in active state.i.e. when discharge is present. It could be either tubotympanic or atticoantral type of disease.
2. Patients of any age.
3. Unilateral as well as bilateral csom
4. Post operative discharging ears.

Exclusion Criteria:

1. Patients on medications either systemic or topical prior to sterile swab collection, atleast a week.

Method Of Collection Of Pus And Analysis:

It was collected with the help of sterile culture swabs. Separate swabs for each ear in case of bilateral disease. . The samples were immediately sent to the microbiology laboratory for bacterial studies. In the laboratory, the ear discharges were collected and examined microscopically. For bacterial isolation, the samples were inoculated on Blood agar, MacConkey's agar and Chocolate agar media and were incubated at 37°C for 24 hours. The antimicrobial susceptibility of the bacterial isolates was assessed by the Kirby- Bauer's disc diffusion method.¹³

III. Observation And Results:

Among 100 patients selected for the study, 51% were male and 49% female. The overall percentage of children in this study was 7%. Age wise analysis of the data showed that maximum number of patients were in the age group of 21-30 years (33%), followed by 16% in the age group of 31-40 years and 41 to 50 years. Following are the tabular forms and bar diagram for age and sex distribution.

Table 1: Sex Distribution

	%
Male	51
Female	49
Total	100

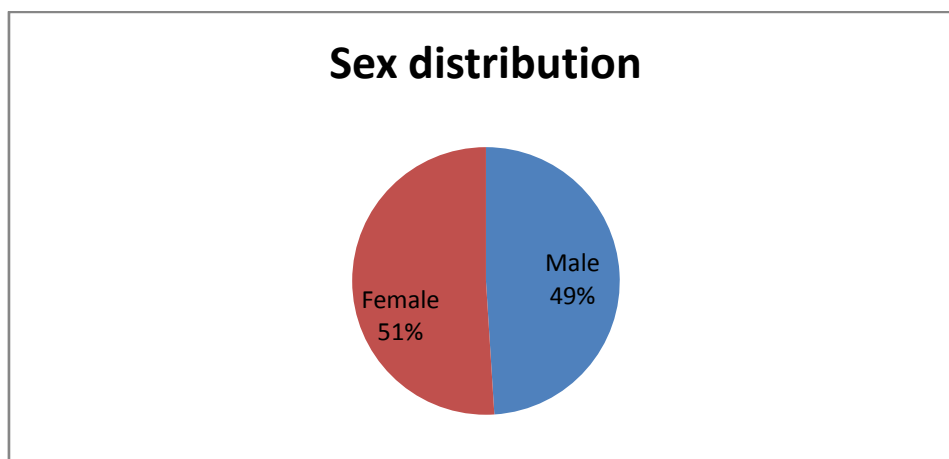


Fig 1 showing sex distribution

Table 2: Age Distribution

In years	No.of patients	%
1-10	7	7
11-20	14	14
21-30	33	33
31-40	16	16
41-50	16	16
51-60	8	8
61-70	6	6

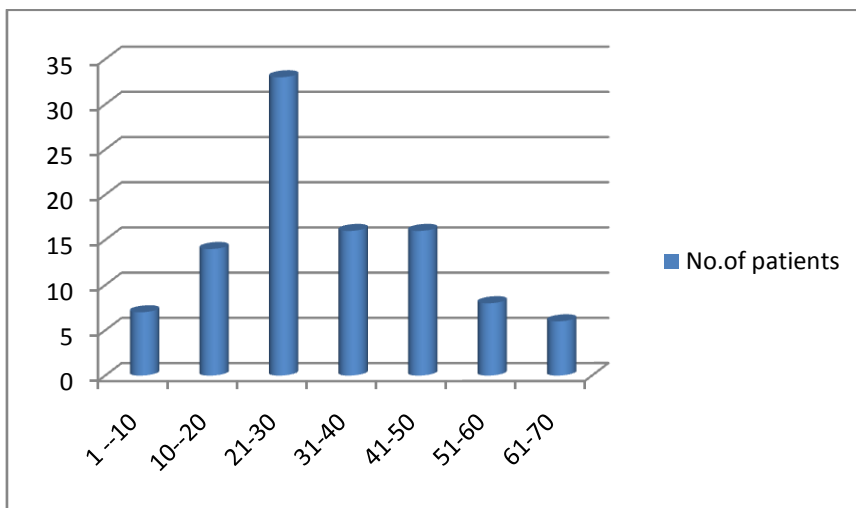


Fig 2 showing age distribution

Table 3: Laterality Of The Disease

	No. of patients	%
Right ear	37	37
Left ear	51	51
Bilateral	12	12

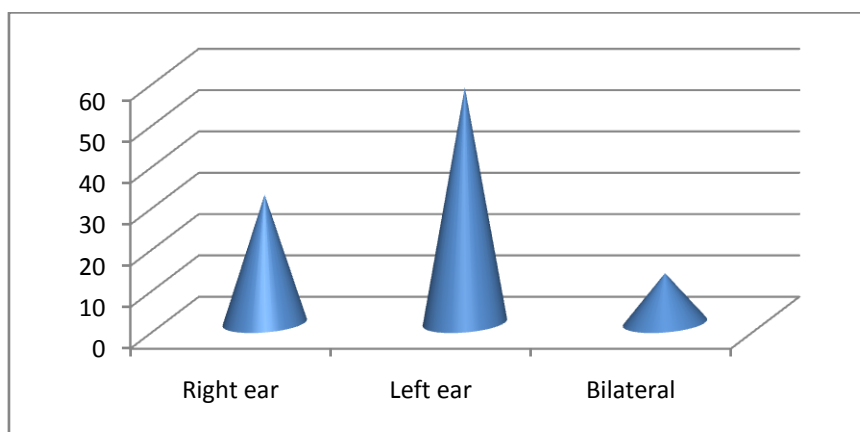


Fig 3 showing laterality of the disease

Table 4: Organism Isolated

	No.of patients	%
No organism isolated	24	24
Pseudomonas aeruginosa	25	25
Staphylococcus aureus	24	24
Klebsiella	7	7
E.coli	7	7
Streptococcus pneumonia	5	5
Proteus species	4	4
Aspergillus niger	3	3
Citrobacter	1	1

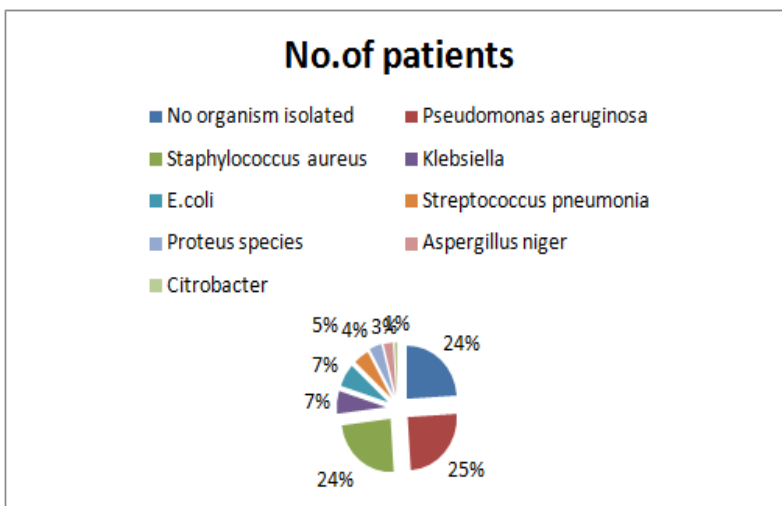


Fig 4 showing % of organism isolated

Table 5: Antibiotic Sensitivity Pattern In Organisms Isolated

	1.A	2.G	3.O	4.Cflxn	5.Lvfxn	7.Az	9.Amp	10.Amp+S	11.Amoxyclav	12.P	13.P+tz	14.E	C-1	C-2	C-3	C-4	C-5	C-6	C-7
Pseudomonas Aeruginosa	73.63%	57.71%	37.81%	95.52%	19.9%	1.99%			3.98%	9.95%	33.83%	5.97%	3.98%	7.96%		11.94%		1.99%	29.85%
Staphylococcus Aureus	79.64%	66.32%	18.8%	75.12%	8.80%	5.28%	1.76%	1.76%	7.04%		5.28%	15.84%	8.8%	12.32%	10.56%	5.28%	1.76%		22.88%
Klebsiella	12.81%	4.27%	1.83%	2.44%	1.22%						1.22%				1.22%				12.20%
E. Coli	9.28%	3.48%	3.48%	11.63%	1.63%	0.58%							0.58%				0.58%		2.32%
Streptococcus Pneumonia	7.14%	4.59%		11.22%		10.2%		0.51%	0.51%						2.16%				
Proteus Sp.	3.60%	0.72%		2.52%									0.36%			0.36%			1.44%
Citrobacter	0.28%			0.56%	0.28%								0.14%	0.14%					0.56%

- | | | | |
|--|--------------------|----------------------------|-------------------------|
| 1. A- Amikacin | 2. G- Gentamicin | 3. O- Ofloxacin | 4. Cflxn- Ciprofloxacin |
| 5. Lvfxn- Levofloxacin | 6. A- Azithromycin | 7. Amp- Ampillicin | |
| 8. Amp+S- Ampicillin+Sulbactam | | | |
| 9. Amoxyclav- Amoxycillin+ Clavulanic acid | | 10. P- Piperillin | |
| 11. P+tz – Piperillin + Tazobactam | | 12. E- Ertapenam | |
| C-1 Ceftriazone | C-2 Cefotaxime | C-3 Cefixime | |
| C-4 Cefoxitim | C-5 Cefaperazone | C-6 Cefaperazone+Sulbactam | |

IV. Discussion

In the present study, the age distribution was more in the age group 21-30years, followed by 31- 40 years and 41- 50 years. Females were more affected than males. Children were 7% in our study. Though unimportant is the laterality of the disease, Left ear discharges were more than right and 12% showed bilateral disease. In the present study, the analysis of our data showed the prevalence of gram negative organisms over gram positive, pseudomonas aeruginosa being commonest followed closely by staphylococcus aureus. In nearly about 24 of the cases, no organism was isolated. In accordance with our studies, studies done by

Harvinderkumar and Sonia Seth⁹ et al concluded pseudomonas(25%) and staphylococcus aureus(24%) as the most commonly isolated from ear discharges. Similarly Loy et al¹⁴, Mansoor et al¹⁵ goes well with our study. In contrast to our study, Adoga et al showed Klebsiella as the most commonly isolated organism.¹⁶ The other organisms isolated in the decreasing frequency in our study are Klebsiella(7%), E.Coli(7%), Streptococcus Pneumonia(5%), Proteus sp and Citrobacter.

The most commonly isolated organism Pseudomonas is highly sensitive Ciproflaxacin(95.52%) followed Amikacin(73.6%), Gentamicin(57.7%), Ofloxacin(37.81%), Piperacillin + Tazobactam (33.38%) and Cefaperazone + Sulbactam(29.38%). Where as Staphylococcus Aureus which was 24% isolated in culture showed sensitivity to Amikacin(79.64%), Ciprofloxacin (75.12%), Gentamycin(66.32%), Cefaperazone and sulbactam(22.88%) and Ofloxacin (18.8%). Klebsiella and E.coli showed maximum sensitivity to Ciproflaxacin, Ofloxacin and Cefotaxime. Streptococcus Pneumoniae showed sensitivity to Cefotaxime, Ciprofloxacin and Amikacin. Overall sensitivity pattern seen in this study is for Ciprofloxacin and Amikacin, followed by Gentamicin, Cefaperazone + Sulbactam and Cefotaxime.

This pattern of sensitivity seen in this study is in accordance to H. Kumar and S.Seth et al⁹ studies where amikacin and ciprofloxacin are the most effective antibiotics. Other studies in accordance are Lee and Park et al¹⁷, Sharma and Agarwal et al¹⁸ and Deb and Ray et al¹⁹. On the contrary, studies like Nwankwo and Salisu et al²⁰ showed ofloxacin, gentamicin and ceftazidime as the most sensitive drug.

V. Conclusion

This study concludes that Pseudomonas is the most common organism isolated in the culture of the discharges in CSOM, followed closely by Staphylococcus aureus. Ciproflaxacin is the most sensitive drug which can be given as first line of treatment in CSOM. Amikacin is also equally effective but being more ototoxic and available as only injectable form. Ciprofloxacin either oral or topical becomes a more preferred option. To our surprise, the most commonly prescribed antibiotic Amoxicillin with clavulanic acid was found to be least effective. Incidentally this antibiotic enjoys high patronage by general duty physicians, being the most often prescribed empirical antibiotic in CSOM. Azithromycin and erythromycin was also found to be not so effective as per this study in CSOM cases. Cephalosporins, belonging to any generation are quite effective and good choice of drugs for actively discharging ears.

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