

# Study of Antibiotic Sensitivity of Aural Swab and the Aetiological Factors of Chronic Otitis Media-Active Mucosal Type

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**Abstract:** Background: Chronic otitis media (COM) refers to chronic inflammation of the muco-periosteal lining of middle ear cleft resulting in ear discharge and deafness. The objective of this study is to evaluate the antibiotic sensitivity and aetiological factors of COM. Methods: This cross-sectional study was conducted from July 2018 to June 2019 for duration of one year among the patients who attended with COM- active mucosal disease at Department of ENT & Head Neck Surgery, Government Medical College Srinagar, India. Total 100 cases were isolated and among them 10 cases had bilateral COM. Aural swab was taken from 110 ears and a predesigned data collection sheet was duly filled up with the information of socioeconomic status of the patient. The laboratory records of every case was systematically organized. The data were analyzed with simple manual analysis using percentage and frequency. Results: About 24% patients were in 31-40 years age group. Out of 100 patients 62% were male. Ear cleaning habit shows, 32% has got the cleaning habit with ear buds. Out of 100 patients 10 had bilateral COM. So out of 110 ears, Culture & sensitivity test viewed that *Pseudomonas aeruginosa* was the most predominant organism - 41.8% followed by *S. aureus*- 30.9% Antibiotic sensitivity profile showed 80% cases having sensitivity to Amikacin then Gentamycin-73.3% .Resistant 10 cases showed 100% sensitivity to Tazobactam. Again out of 38 cases of Gram positive organism 78.9% were sensitive to Amoxycylav. 6 resistant cases showed 100% sensitivity to Meropenem. Conclusion: By this study we will be able to make an idea about the aetiological and predisposing factors and antibiotic sensitivity of COM-active mucosal variety.

**Keywords:** COM, Culture and Sensitivity, Antibiotic, Aetiological Factors

## 1. Introduction

A WHO/CIBA Foundation workshop in 1996 defined "Chronic suppurative otitis media (CSOM) as stage of disease in which there is chronic infection of the middle ear cleft, i.e., Eustachian tube, middle ear and mastoid, and in which a non intact tympanic membrane (e.g., perforation or tympanostomy tube) and discharge (otorrhea) are present for at least 2 weeks or more." [1] Chronic otitis media and its complications are the most common conditions seen by otologists, pediatricians and general practitioners. Early bacteriological diagnosis of all cases will assure accurate and appropriate effective therapy. Knowledge of the local microorganism pattern and their sensitivity to different antibiotics is essential to formulate a protocol for empirical antibiotic therapy [2]. In developing countries like India, COM is a common disease in clinical practice. Prevalence of COM in developing countries represents a wide range- 0.4% to 33.3%. In India its prevalence is 5.2%. The word COM implies a permanent abnormality of the pars tensa or pars flacida, most likely a result of earlier acute otitis media, negative middle ear pressure or otitis media with effusion. Here a long standing inflammatory disease affecting mucoperiosteal lining of the middle ear cleft is found [3]. It is generally believed that mucosal COM arise from an episode of acute otitis media where after rupturing the tympanic membrane fails to heal. Repeated infection occurs in the middle ear from the nasopharynx either by aspiration of nasopharyngeal microbes or due to reflux from the

nasopharynx. Repeated infection also occurs by transportation of microbes from the ear canal through the perforation [4, 5]. Malnutrition, lack of personal care, low socioeconomic condition, poor hygiene, overcrowding, cleaning ear with unsterile material, trauma to the ear all are individual factor in the development of chronic otitis media. Insertion of a tympanostomy tube is also a recognized cause of subsequent tympanic membrane perforation [6]. Treatment is directed to make the ear dry, prevent recurrent infection and improve hearing and also prevent complications. Treatment includes ear toileting, topical antibiotics, systemic antibiotics and surgical treatment. It depends upon the condition of the ear and also directed to improvement of the predisposing factors and other causative factors [7]. A wide range of organisms are isolated from the cases of COM which vary from study to study. Predominating organisms are *Pseudomonas aeruginosa*. Besides *Staphylococcus aureus*, *Proteus* species, *E.coli*, *Diphtheroids*, *Streptococci*, *bacteroids*, mixed pathogens and fungi may also be present [8,9]. The subject of my study is chronic mucosal disease in relation to their bacteriological pattern, isolated from the diseased ear. By studying these, we hope to be able to make an idea about the aetiological and predisposing factors of the disease. We also hope to detect the most sensitive antibiotic for appropriate treatment.

## 2. Material and Methods

This cross sectional study was conducted from July 2018 to June 2019 for a duration of one year among the patients who attended with COM- active mucosal disease at Department of Otolaryngology & Head Neck Surgery, Government Medical College Srinagar.

### Inclusion Criteria:

- 1) Chronic ear discharge for more than 3 months.
- 2) Patients not receiving antibiotics for at least last 2 weeks.
- 3) COM active mucosal disease.

### Exclusion Criteria:

- 1) COM squamous type.
- 2) Otomycosis.
- 3) Otitis externa.

Written informed consent from all study subjects were taken. Confidentiality of subjects was maintained. All relevant history and data was collected in a pre-designed data collection sheet on the basis of age, sex, educational status, socioeconomic condition, area of residence and laboratory record of causative organism and antibiotic sensitivity. The data were analyzed with simple manual analysis using percentage & frequency.

## 3. Results

Out of 100 Patients 62 (62%) were male and 38 (38%) were female. Male, female ratio was 1.6:1. Most of the patient were in 31-40 age group

**Table 1:** Age group distribution n=100

No	Age (in years)	Total number of cases n=100	%
01	<01	04	4
02	1-10	22	22
03	11-20	16	16
04	21-30	20	20
05	31-40	24	24
06	41-50	08	8
07	51-60	04	4
08	>61	02	2

**Table 2:** Ear cleaning habit of study population n=100

Materials	Number	%
Cotton bud	32	32
Match stick	16	16
Cloth with sticks	12	12
Feathers	10	10
Hair clips	08	8
No habit	22	22

**Table 3:** Organisms identified n=110

S. no	Name of organism	Total number of cases	%
1.	Pseudomonas aeruginosa	46	41.8
2.	Staph.aureus	34	30.9
3.	Proteus	06	5.45
4.	E. Coli	06	5.45
5.	Strep.pneumoniae	04	3.63
6.	Klebsiella	02	1.81
7.	Mixed (pseudomonas & candida albicans)	02	1.81
8.	No organism	10	9.09

**Table 4:** First line antibiotic sensitivity test n=60

Serial no	1 <sup>st</sup> line sensitive antibiotic	No. of cases	%
1.	Amikacin	48	80
2.	Gentamycin	44	73.3
3.	Ciprofloxacin	42	70
4.	Azithromycin	32	53.3
5.	Cephalosporin	30	50
6.	Clindamycin	10	16.6
7.	Resistant	10	16.6

**Table 5:** Second line antibiotic sensitivity test n=10

Serial no	2 <sup>nd</sup> line sensitive antibiotic	No. of cases	%
1.	Carbenicillin	8	80
2.	Tazobactam	10	100

**Table 6:** Gram positive organism sensitivity test n=38

Serial no	1 <sup>st</sup> line sensitive antibiotic	No. of cases	%
1.	Amoxyclav	30	78.9
2.	Ceftriaxone	28	73.6
3.	Flucloxacillin	28	73.6
4.	Gentamycin	26	68.4
5.	Ciprofloxacin	26	68.4
6.	Resistant	06	15.7

## 4. Discussion

This study included 100 patients. The age distribution showed that the highest number of cases (24%) of chronic otitis media (COM) were found in the age group 31-40 years. But the prevalence of COM was more in the age group 0-10 years. This is also supported by studies like those of Vikram BK et al [10] and Elden LM et al[11] which were carried out in developing countries. However, this study was carried out in a particular group of population where the proportion of adult population was more compared to other age groups. Similar results were found in two studies which were carried out by Vikram Bk et al[10] and Loy AHC et al[12] in Singapore and India. This study showed that COM has a slight male predominance (1.6:1), also in persons who are habitual of cleaning ears by cotton bud (32%). These results were supported by most of the studies which were carried out in different parts of the world, like Agarwal A et al[13] and Gul AA et al[14]. This study showed 64% patient came from urban area, 44% has pakka housing. But some other studies showed that the disease was more prevalent in low socio-economic class, those with poor personal hygiene, illiterate populations as described by Biswas AC et al[15]. The difference was may be due to the fact that in this study most of the patients came from a particular group of population where their living statuses were better than others. These results were also supported by studies which were carried out in urban population by Ahmed KU et al[16]. In this series it was revealed that Pseudomonas aeruginosa (41.8%) was the most common isolated organism in COM followed by Staphylococcus aureus (30.9%). These findings were also supported by many studies which were carried out in south-east Asia region showed by Gul AA el at[14] and JHAAk et al[17]. Our study depicted that Gram negative organism specially Pseudomonas aeruginosa was highly (80%) sensitive to Amikacin and 100% Resistant species were sensitive to Tazobactam, which was supported by Swayamisidha A et al[18] and Shyamala R et al [19]. The study also showed Gram positive organism including staphylococcus aureus

having highest (78.9%) sensitivity to Amoxyclav. Another study revealed 91% sensitivity of *Pseudomonas aeruginosa* to Amikacin and 88% to Gentamicin. Moreover Gram negative organism showed 100% sensitivity to Imipenem. Supported by Rahimgir Md et al [20] .

## 5. Conclusion

*Pseudomonas aeruginosa* is the commonest microorganism in chronic otitis media, *Staphylococcus aureus* being the next commonest Gram positive organism found. Most of the Gram positive organism are sensitive to Amoxyclav and Gram negative organism are sensitive to Amikacin. So people are to be educated regarding their hygiene, housing, personal habit and also to be prescribed appropriate antimicrobial agents that will minimize the period of treatment, misuse of antibiotics and also the relative cost of treatment.

## 6. Financial support and sponsorship

Nil

## 7. Conflicts of interest

None

## References

- [1] WHO/CIBA Foundation Workshop. Prevention of Hearing Impairment from Chronic Otitis Media. CIBA Foundation, London, UK; 1996. Available from: [http://WHO\\_PDH\\_98.4.pdf](http://WHO_PDH_98.4.pdf). [Last accessed on 2019 Nov 21].
- [2] Mirza IA, Ali L, Ali L and Arshad M. Microbiology of CSOM – Experience at Bahawalpur. *Pak Armed Forces Med J* 2008; 4: 82-85.
- [3] Browning GG, Merchant SN, Kelly G, Swan IR, Canter R and Mckerrow WS. Chronic otitis media. In: Scott-Brown's otolaryngology, Head and Neck surgery. 7 th ed. 338 Euston Road, London: Hodder Arnold publisher; 2008. p. 3396 - 3445.
- [4] Poorey VK, Arati Iyer. Study of bacterial flora in CSOM and its clinical significance. *Indian Journal of Otolaryngology and Head-Neck Surgery* 2002; 54 (2): 91-95.
- [5] Oyeleke SB. Screening for bacteria agents responsible for otitis media and their antibiogram. *African Journal of Microbiology Research* 2009; 3(5): 249- 252.
- [6] Youngs R. Chronic suppurative otitis media-mucosal disease, In Ludman disease of the ear. 6th ed. 41 Bedford Square, London: Edward Arnold; 1998. p. 374-385.
- [7] Hamilton J. Chronic otitis media in childhood. In Scott-Brown's otolaryngology, Head and Neck surgery. 7th ed. 338 Euston Road, London: Hodder Arnold publisher; 2008. p. 928-964.
- [8] Afolabi OA, Salaudeen AG, Ologe FE. Pattern of bacterial isolates from patients of CSOM in a tertiary hospital, North Central Nigeria. *African Health Science* 2012; 12(3): 362-367.
- [9] Prakash M, Lakshmi K, Anuradha S. Bacteriological profile and their antibiotic susceptibility pattern of cases of chronic suppurative Otitis media. *Asian Journal of Pharmaceutical & Clinical Research* 2013; 6(3) 210-212.
- [10] Vikram BK, Khaja N, Udayashankar SG, Venkatesha BK and Manjunath DM. Clinico - epidemiological study of complicated and uncomplicated chronic suppurative otitis media. *The Journal of Laryngology & Otology* 2008; 122: 442- 446.
- [11] Elden LM and Coyte PC. Socioeconomic Impact of Otitis Media in North America. *The Journal of Otolaryngology* 1998; 27(2): 9-16.
- [12] Loy AHC, Tan AL and Lu PKS. Microbiology of chronic suppurative otitis media in Singapore. *Singapore Medical Journal* 2002; 43(6): 296-299.
- [13] Agarwal A, Kumar D, Goyal A. Microbiological profile & their sensitivity pattern in patients with ear discharge. *Indian Journal of otolaryngology* 2013; 19: 5-8.
- [14] Gul AA, Ali L, Rahim E and Ahmed S. Chronic Suppurative Otitis Media; Frequency of *Pseudomonas aeruginosa* in patients and its sensitivity to Various antibiotics. *Professional Med Journal* 2007; 14 (3): 411- 415.
- [15] Biswas AC, Haque AHMZ, Khan FA, Alauddin M and Dutta PG. A comparative study of prevalence of CSOM between rural and urban school going children. *Bangladesh Journal of Otolaryngology* 2005; 11 (1/2): 17-21
- [16] Ahmed KU, Akaiduzzaman DGM. Microbiologic characteristics and drugs sensitivity to the organisms in chronic suppurative otitis media. *Bangladesh Journal of Otolaryngology* 2000; 6 91): 13-16.
- [17] Jha AK, Singh JB and Dutta D. Microorganisms present in discharging otitis media in a group of patients in Kathmandu. *Nepal Medical College Journal* 2001; 3: 25-28.
- [18] Swayamsidha A, Parag S, Goel H.C. Microbiology of CSOM without cholesteatoma. *National Journal of Otolaryngology* 2015; 3(1): 28-30.
- [19] Shyamala R, Sreenivasulu R, Study of Bacteriological agent of chronic suppurative otitis media-Aerobic Culture & evaluation. *Journal of microbiology and biotech* 2012; 2(1): 152-162.
- [20] Rahimgir Md, Nessa M, Khan AA. Pathogenic bacteria isolated from purulent lesion and microbial resistance of the major pathogens. *Bangladesh Journal of Microbiology* 2001; 18(2): 99104