

Original Article

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

Md Nesar Uddin¹, Mohammed Sirazul Islam², Mohammad Delwar Hossen³
Mohammed Iftekharul Alam⁴, Mohammad Kamal Hossain⁵

Abstract:

Background: Chronic otitis media (COM) refers to chronic inflammation of mucoperiosteal lining of middle ear cleft resulting in aural 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 2017 to June 2018 for duration of one year among the patients who attended with COM- active mucosal disease at Department of ENT & Head Neck Surgry, Combined Military Hospital (CMH) Chattogram. Total 50 cases were isolated and among them 5 cases had been suffering from bilateral COM. Aural swab was taken from 55 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 50 patients 62% were male. 44% patient lived in barrack. Ear cleaning habit shows, 32% has got the cleaning habit with cloth and stick. Out of 50 patients 5 had bilateral COM. So out of 55 ears, Culture & sensitivity test viewed that *Pseudomonas aeruginosa* was the most predominant organism - 41.8% followed by *S. aureus*- 30.9% Antibiotic sensitivity profile shows, 80% cases showing sensitivity to Amikacin then gentamycin-73.3% Resistant 5 cases showed 100% sensitivity to Tazobactam. Again out of 19 cases of Gram positive organism 78.9% were sensitive to Amoxyclav. 3 resistant cases showed 100% sensitivity to Meropenem.

Conclusion: By studying this topic we hope to 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

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1. Classified Specialist in ENT and Head-Neck Surgery, CMH Dhaka
 2. Classified Specialist in ENT and Head-Neck Surgery & HOD, CMH Dhaka
 3. Classified Specialist in ENT and Head-Neck Surgery, CMH Dhaka
 4. Classified Specialist in ENT and Head-Neck Surgery, CMH Dhaka
 5. Classified Specialist in ENT and Head-Neck Surgery, CMH Dhaka

Address of Correspondence: Lieutenant Colonel Md Nesar Uddin, Classified Specialist in ENT and Head-Neck Surgery, CMH, Dhaka, Bangladesh. Cell: : +8801769000125. E-mail: nesar1125@gmail.com

Introduction:

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 antibiotic sensitivity is the essential to formulate a protocol for empirical antibiotic therapy¹.

In Bangladesh COM is a common disease in clinical practice. Prevalence of COM on developing countries represent a wide range- 0.4% to 33.3%. In Bangladesh its prevalence is 7.39%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 found³.

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 socio-economic 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 tympanostomy tube is also a recognized cause of subsequent tympanic membrane perforation⁶.

Treatment is directed to make the ear dry, prevent recurrent infection and improve hearing and also make the ear safe from various complications. Treatment includes ear toileting, topical antibiotic, systemic antibiotic and surgical treatment. It depends upon the condition of the ear and also directed to improvement of the predisposing factors and other causative factors⁷.

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 pathogen 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 affected ear. By studying these, we hope to able to make an idea about the aetiological and predisposing factors of disease. We also hope to detect the most sensitive antibiotic for appropriate treatment.

Methods:

This cross sectional study was conducted from July 2017 to June 2018 for duration of one year among the patients who attended with COM- active mucosal disease at Department of Otolaryngology & Head Neck Surgery, CMH Chattogram.

Inclusion Criteria:

1. Chronic aural discharge for more than 3 months
2. Patient not receiving antibiotics for at least last 14 days
3. COM active mucosal disease

Exclusion Criteria:

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

For all procedure written informed consent from all study subjects were taken. Confidentiality of subjects was maintained. All relevant history and data were 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.

Results:

Out of 50 Patients 31 (62%) were male and 19 (38%) were female. Male, female ratio was 1.6:1. Most of the patient are in 31-40 age group.

Table I :
Age group distribution (n=50)

Sl. No.	Age (in years)	Total number of cases n=50	%
01	<01	02	4%
02	01-10	11	22%
03	11-20	08	16%
04	21-30	10	20%
05	31-40	12	24%
06	41-50	4	8%
07	51-60	02	4%
08	>61	01	2%

Table II :
Ear cleaning habit of study population (n=50)

Materials	No.	%
Cotton bud	06	12%
Match stick	08	16%
Feathers	05	10%
Cloth with sticks	16	32%
Hair clips	04	08%
No habit	11	22%

Table III :
Organisms identified (n=55)

SL. No	Name of organism	Total number of cases	%
1.	Pseudomonas aeruginosa	23	41.8%
2.	Staph. aureus	17	30.9%
3.	Proteus	03	5.45%
4.	Esch. coli	03	5.45%
5.	Strept. pneumoniae	02	3.63%
6.	Klebsiella	01	1.81%
7.	Mixed organism (Pseudomonas & Candida albicans)	01	1.81%
8.	No organism	05	9.09%

Table IV :
First line antibiotic Sensitivity test (n=30).

Sl. No.	1 st line sensitive antibiotic	No. of cases	%
1.	Amikacin	24	80%
2.	Gentamycin	22	73.3%
3.	Ciprofloxacin	21	70%
4.	Azythromycin	16	53.3%
5.	Cefalosporin	15	50%
6.	Clindamycin	5	16.6%
7.	Resistant	5	16.6%

Table V :
Second line antibiotic sensitivity test (n=5)

Sl. No.	2 nd line sensitive antibiotic	No. of cases	%
1	Carbenicillin	4	80%
2	Tazobactam	5	100%

Table VI :
Gram positive organism sensitivity test
(n=19)

Sl. No.	1 st line sensitive antibiotic	No. of cases	%
1.	Amoxyclav	15	78.9%
2.	Ceftriaxone	14	73.6%
3.	Flucloxacillin	14	73.6%
4.	Gentamycin	13	68.4%
5.	Ciprofloxacin	13	68.4%
6.	Resistant	3	15.7%

Discussion:

Among 50 patients, the age distribution showed that highest 24% cases of chronic otitis media (COM) were found in the 31-40 years of age group. But the prevalence of COM were more common in the 0-10 years old age group. This is also supported by Vikram BK et al¹⁰ and Elden LM et al¹¹ which were carried out in developing countries. The difference of our study may be due to the study carried out in a particular group of population where in proportion, adult population were more common. Similar results were found in two studies which were carried out by Vikram BK et al¹⁰ and Loy AHC et al¹² in Singapore and India.

This study showed that COM has slight male predominance (1.6:1), also in persons who had a habit of cleaning ears by cloth and sticks (42%). These results were supported by most of the studies which were carried out in different parts of the world. Like Agarwal A et al¹³ and Gul AA et al¹⁴.

This study showed 64% patient came from urban area, 44% has pakka housing. But other study showed that the disease were more prevalent in poor housing status, lack of personal hygiene, illiterate populations. As described by Biswas AC et al¹⁵. The difference was may be due to the fact that in

this study most of the patients came from a particular group of population of Armed Forces where their living statuses were better than others. This results were also supported by studies which were carried out in urban population by Ahmed KU et al¹⁶.

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%). This findings were also supported by many studies which were carried out in south-east Asia region showed by Gul AA et al¹⁴ and JHAAk et al¹⁷. Another studies carried out in Nigeria, Pakistan and North America by Nwabuisi C¹⁸, Ahmed B et al¹⁹ and Rajat P et al²⁰ showed *Staphylococcus aureus* was found the most common isolated organism in chronic suppurative otitis media¹⁸⁻²⁰. Our study depicted that Gram negative organism specially *Pseudomonas aeruginosa* was highly (80%) sensitive to Amikacin and Resistant species 100% was sensitive to Tazobactam. Which was supported by Swayamisidha A et al²¹ and Shyamala R et al²².

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 al²³.

Conclusion:

Pseudomonas aeruginosa is the commonest pathogen in chronic otitis media, *Staphylococcus aureus* is another 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.

References:

1. Mirza IA, Ali L, Ali L and Arshad M. Microbiology of CSOM – Experience at Bahawalpur. Pak Armed Forces Med J 2008; 4: 82-85.
2. Rahim MM, Joarder MAH, Taous A, Hossain D, Ahmed MU and Sayeed AHMN. Prevalence of CSOM in selected rural and urban community of Bangladesh. Bangladesh Journal of Otorhinolaryngology 2006; 12 (1): 1-6.
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. 7th 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. Nwabuisi C. Pathogenic agents of chronic suppurative otitis in Ilorin, Nigeria. *East American Medical Journal* 2002; 79(4): 1-6.
19. Ahmed B, Hydri AS, Afridi AAK. Microbiology of ear discharge in Quetta. *Journal of college of physicians & Surgeons Pak* 2005; 15: 583.
20. Rajat P, Deepak J, Vikrant N. Microbiology of CSOM in a tertiary care set up. *North American Journal of Medical Science* 2013; 5(4): 282-287.
21. Swayamsidha A, Parag S, Goel H.C. Microbiology of CSOM without cholesteatoma. *National Journal of Otolaryngology* 2015; 3(1): 28-30.
22. 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.
23. 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): 99-104.