

ORIGINAL ARTICLE

Evaluation of Antibiotic Sensitivity of the Aural Swab and the Aetiological Factors of Chronic Otitis Media-active Mucosal TypeSAEED KHAN¹, ARSHAD ABBAS², KHALIL ULLAH³, ALI KHAN⁴, MUHAMMAD NADEEM⁵, AYESHA SHAFI⁶¹Assistant Professor ENT, HMC / KGMC, Peshawar²Assistant Professor ENT, Gajju Khan Medical College, Swabi³Medical Officer ENT, DHQ Hospital, Khar Bajaur⁴Assistant Professor ENT, Gomal Medical College, D I Khan⁵Associate Professor ENT, M. Islam Medical & Dental College, Gujranwala⁶Assistant Professor ENT, M. Islam Medical & Dental College GujranwalaCorresponding author: Arshad Abbas, Email: arshadabbas4000@gmail.com**ABSTRACT**

The inflammation of the muco-periosteal lining of the middle ear cleft causes the disease known as chronic otitis media (COM). It is characterized by deafness and ear discharge. The children are more prone to this infectious disease. It is the main reason behind hearing impairment. It is creating a challenging scenario for the health care physicians and doctors.

Objective: The purpose of this research work was to evaluate the antibiotic sensitivity of the aural swab. The aetiological factors associated with the infection were also studied.

Study design: It is a cross-sectional study with the statistical approach.

Methods: The study was conducted on 55 patients who attended the ENT and head neck surgery department of Hayatabad Medical Complex Peshawar and M. Islam Medical & Dental College, Gujranwala during the period from January 2021 to June 2022. Out of the 55 patients the 7 patients were diagnosed with bilateral COM. The aural swab was taken from each patient. Each patient was asked to fill the questionnaire for evaluation of the socioeconomic status of the patients. The laboratory and socioeconomic findings were recorded and analyzed by using percentage and frequency.

Results: The age group of 31 to 40 years contributed to 24% patients. The 34 patients were male and 21 were female. The percentage ratio was 1:6:1. Out of the 55 patients, 7 were diagnosed with the bilateral COM. The pseudomonas aeruginosa was observed in the 43% cases while S.aureus was observed in the 32% cases. Out of the 33 cases the 81% showed sensitivity to Amikacin, while 75% cases showed sensitivity to Gentamycin and 69% to Ciprofloxacin. Out of the 21 cases of gram positive organisms, 80% showed sensitivity to Amoxycylav, 71% to ceftriaxone and other 71% to Flucoloxacillin. The sensitivity of the 4 resistant cases against the Meropenem was observed to be 100%.

Conclusion: Chronic otitis media is the most common disorder of childhood. A better understanding of the risk factors and antibiotic sensitivity is necessary for the management of treatment strategies. This study provides in-depth knowledge of antibiotic sensitivity and the aetiological factors of the COM.

Keywords: Bilateral COM, Aetiological factors, Antibiotic sensitivity, Aural discharge, Pseudomonas aeruginosa

INTRODUCTION

COM is most commonly occurring complication. For management of the disease and selection of the effective treatment therapy the early diagnosis is highly necessary. The in-depth knowledge of antibiotic sensitivity and microorganism pattern also facilitate the selection of antibiotic therapy protocol. It is characterized by the chronic infection of the middle ear¹. This complication is highly observed in the patients attending the otorhinolaryngology department of the hospital. This indolent middle ear inflammation is divided into two distinct types. The recurrent discharge is observed through the tympanic membrane perforations. The chronic suppurative otitis media (CSOM) is characterized by persistent infection caused by the bacteria. It leads to impaired hearing, and chronic membrane perforation²⁻³.

Chronic otitis media (COME) with effusion is characterized by the unresolved inflammation of the middle ear cleft. The main difference between COSM and COME that presence and absence of otorrhea. The thick mucus filled the middle ear with permanent impaired hearing. The tympanic membrane can be retracted. This type if remain untreated ultimately leads to the chronic otitis media⁴. The tympanic membrane completely collapsed in this type. This type is most commonly observed by the otologists and pediatricians. The incidence of COM in the developing countries is reported to be 0.4% to 33%⁵⁻⁶.

The permanent defect is observed in the pars tensa or pars flacida. The negative middle ear pressure effect the mucoperiosteal lining of the middle ear. The tympanic membrane become failed to heal in the mucosal COM type. Because of the nasopharyngeal microbes inhalation the repeated infection observed in the middle ear. The microbes travel through the perforations in the middle ear. The main causes associated with the COM are poor hygienic conditions, low socioeconomic conditions and ear trauma. The others causes are insertion of tympanostomy tube and lack of personal care⁷⁻⁸.

Systemic and topical antibiotics, ear toileting are considered to be effective strategies for treatment of the infection. A diverse range of microorganisms is associated with causing this infection but, Pseudomonas aeruginosa is predominantly reported in most of the cases. Other bacteria involved in causing the infection are proteus species, E.coli, Streptococci and Staphylococcus aureus. Sometimes the fungi and different pathogens are isolated from the aural swab⁹⁻¹⁰.

The aural swabs were isolated from the affected ears. In this study the bacteriological pattern of the chronic mucosal ear complication is studied. This study provides us with the knowledge of predisposing and aetiological factors. The sensitivity of the antibiotics was also evaluated¹¹⁻¹².

MATERIALS AND METHODS

Total 55 patients with COM attended the otolaryngology department of Hayatabad Medical Complex Peshawar and M. Islam Medical & Dental College, Gujranwala during the period from January 2021 to June 2022 were included in the study. The ethical committee of our institute approved the study. According to the inclusion criteria the patients with the COM disease having history of the aural discharge for more than three month were included. It was also assured that the included patients didn't receive the antibiotics from the last 14 days.

The patients diagnosed with the otitis externa, otomycosis and COM squamous type were excluded from the study. The written informed consent was taken from every patient included in the study. The confidentiality of every patient was maintained. In the pre-designed study the data about the history, age, sex and socioeconomic and education status were recorded. The laboratory findings and antibiotic sensitivity of every patient was also recorded.

RESULTS

There were a total 55 patients taken for this study. Among these 55 patients 34 (62%) were male and 21 (38%) were female. The ratio of male and female was 1.6:1. The patients included in this study ranged from 31 to 41 age group. Table shows the age group distribution of the participants taken for study

Table 1: Distribution of age groups (n=55)

Serial no.	Age of patients in years	Total cases n=55	Percentage
1	Less than one year	3	5%
2	1-11	10	18%
3	12-22	9	16%
4	23-33	11	20%
5	34-44	13	23%
6	44-55	5	9%
7	55-65	3	5%
8	Greater than 65 years	1	1%

Here the table depicts that what is the cleaning habit of ear among the members of the study.

Table 2: Habit of ear cleaning in the study group

Ways to clean	No. of participants	Percentages
Cotton buds	7	12%
Stick	9	16%
Any feather	6	11%
Stick with cloth on	17	30%
Clips for hair	5	9%
No habit	12	21%

The organisms identified in the chronic otitis media are shown in the table. The table shows highest percentage of bacteria that are isolated from chronic otitis media is *P aeruginosa*.

Table 3: Identified organisms

Serial no.	Organism	Total patients	Percentage
1	<i>P aeruginosa</i>	24	43%
2	<i>S. aureus</i>	18	32%
3	<i>Proteus</i>	4	7%
4	<i>E coli</i>	4	7%
5	<i>S. pneumonia</i>	3	5%
6	<i>Klebsella</i>	2	3%
7	Mixed (<i>pseudomonas</i> and <i>candida</i> strains)	1	1%
8	None	6	10%

Table 4: Sensitivity test for 1st line antibiotics for n= 33

Serial no.	1 st line antibiotics	No. of patients	Percentage
1	Amikacin	27	81%
2	Gentamycin	25	75%
3	Ciprofloxacin	23	69%
4	Azythromycin	18	54%
5	Cephalosporin	17	51%
6	Clindamycin	6	18%
7	Resistant varieties	6	18%

Table 5: Second line sensitivity test for antibiotics n=6

Serial no.	Second line antibiotic sensitivity	No. of patients	Percentage
1	Carbenicillin	5	80%
2	Tazobactam	6	100%

Table 6: Sensitivity test for gram positive strains n=21

Serial no.	1 st antibiotic sensitivity	No. of patients	Percentage
1	Amoxyclav	17	80%
2	Ceftriaxone	15	71%
3	Flucloxacillin	15	71%
4	Gentamycin	14	66%
5	Ciprofloxacin	14	66%
6	Resistance	4	19%

DISCUSSION

Among the 55 patients that contributed in this study, it was observed that the highest cases were reported in the case of 30-40 age groups. Almost 24 % cases were present at that time which shows that this age group is most vulnerable for this medical condition¹³. But it was also observed that the incidence of COM was more in the younger age group that had participants of 10 years' age. The procedures carried out in this study were informed to the patients. The written consent was taken from all participating candidates. The data was kept confidential. The results were analyzed by using percentage¹⁴.

According to studies carried out in developing countries by Vikrant BK et al and Elden LM et al the age group 30-40 had more cases. The difference that our study showed may be because the participants taken for this study included more adults and less members from other age groups. Almost similar findings were found by Vikrant Bk et al¹⁵⁻¹⁶.

According to our studies the COM had more incidence in case of male patients, and the disease condition was more prevalent in patients that had the habit of cleaning their ears on a regular basis. Also the patients that used to clean their ear by using any cloth or stick had most chances of incidence of the disease. These studies were supported by a lot of other findings as well in many other countries of the world¹⁷.

The treatment was provided to remove any infection from the ear and to make the ear dry, so that any recurrent infection can be avoided. It will improve any hearing ability of the patient and other complications can be avoided¹⁸⁻¹⁹. There are a number of treatments that can be used to get rid of chronic otitis media, it all depends upon the present condition of the infection and which treatment can be used by doctors. The treatment includes proper cleaning of the ear, surgical treatment, use of any antibiotic (systemic, topical).

According to this study, more than 50 % of patients had roots in urban life style. As per studies the disease was more common in case of people living in poor setups where there is no personal hygiene and where the population is illiterate²⁰. The lack of awareness among the population can be one of the reasons for the prevalence of disease among poor people.

As per studies lack of personal hygienic care, poor economic state of the population, overcrowding and cleaning the ear with dirty cloth are some of the reasons of chronic otitis media²¹.

Maybe the study showed these findings because the population belonged to the Armed Forces that's why their style of living was very much better than the rest. They had facilities not anyone can afford. The results of this study were also supported by Ahmed KU et al²².

As per these studies it was revealed that *Pseudomonas aeruginosa* (42%) was the organism that was mostly isolated from the patient. Then it was followed by *S. aureus* in the case of 30% of the participants. These studies were supported by other studies carried out by a group of scientists in South Asia by Gul AA et al and his fellows.

Other studies were also carried out in many other countries like Nigeria, Pakistan, North America etc. these findings showed that *S. aureus* was mostly the organism extracted from chronic otitis media. As per our studies Gram negative bacteria *P aeruginosa* was found to be very sensitive to the antibiotic Amikacin in 80% cases and in 100 % cases the resistance was shown to Tazobactam. These studies were also supported by Swayamisidha A et al and Shamala R et al²³⁻²⁴.

As per our findings the Gram positive bacteria that include *S. aureus* had most chances of sensitivity to Amoxyclav. As per studies carried out by Rahimgir d et al the gram negative bacteria showed quite effective resistance to Imipenem.

There is an urgent need to provide awareness to the public towards personal hygiene, together with the hygiene appropriate medicines will help you get rid of chronic otitis media. The use of anti-microbial medicines and adapting proper hygienic conditions

help patients get rid of problems like over usage of antibiotics and costly treatment of chronic otitis media²⁵.

CONCLUSION

Pseudomonas aeruginosa is the most prevalent form of bacteria found in chronic otitis media. Other than that another bacteria *Staphylococcus aureus*, a gram positive bacteria was also found in chronic otitis media. It was observed that the gram negative ones are sensitive to Amikacin and gram positive bacteria shows resistance towards Amoxycylav. There is need to make people aware of their hygiene in their home, and life style. Developing healthy lifestyle along with antimicrobial components prescribed will help to lower the chances of chronic otitis media, and it will help the patients to get rid of issues like treatment period, cost of the treatment used and any over dose of antibiotics.

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