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Original Article

Pattern and culture and sensitivity of microbes in patients with chronic suppurative otitis media at a tertiary care center

Gudise Abhinav Kiran [1], K. Sravani Reddy [2], Baddam Rachna Reddy [3]

[1] Assistant Professor ; Department of ENT ; Malla Reddy Institute of Medical Sciences, Hyderabad, Telangana, India

[2] Assistant Professor; Department of ENT; Father Colombo Medical College, Warangal, Telangana, India

[3] Assistant Professor; Department of ENT ; Malla Reddy Medical College For Women ; Suraram 'X' Roads, Hyderabad, Telangana, India

Corresponding Author:

Gudise Abhinav Kiran

Assistant Professor ; Department of ENT ; Malla Reddy Institute of Medical Sciences, Hyderabad

Phone no : 9966530249

Email id: abhinavvasu@gmail.com

Abstract:

Background: With use of antibiotics, complication rate due to chronic suppurative otitis media (CSOM) has come down. But, irrational use can lead to resistance to antibiotics. Indiscriminate use of antibiotics has lead to variation in antibiogram of organisms causing CSOM.

Objective: To study pattern and culture-sensitivity of microbes in patients with CSOM

Methods: Hospital based cross sectional study was carried out among 70 cases having CSOM. Detailed history, general examination, ear examination was carried out. Pus swab was collected and sent to Microbiology department for culture and sensitivity. Reports were collected and entered.

Results: Among 70 ear swabs, growth was seen in 85.7%. Only bacterial growth was seen in 57% while only fungi were seen in 8.5%. Both bacteria and fungi were seen in 20%. Among 54 bacterial isolates, most common was staphylococcus aureus in 40.7% followed by Pseudomonas aeruginosa in 27.7%. Among 20 fungal isolates Aspergillus was seen in 60% and Candida in 40%. Among 22 staphylococcus aureus, 8 were sensitive to amoxyclav. Among 15 cases due to pseudomonas aeruginosa, 7 were sensitive to ceftazidime. Among six cases due to klebsiella, 50% were sensitive to ceftazidime. Among four cases due to Escherichia coli, 50% were sensitive to azithromycin.

Conclusion: Staphylococcus species is the major offending pathogen in CSOM and Amoxyclav followed by Gentamicin were found to be most effective antibiotic. The organisms are increasingly becoming resistant to common antibiotics, therefore swab from the discharging ear for culture and sensitivity to antibiotics is very important to select the appropriate antibiotic to prevent resistance.

Key words: culture, sensitivity, chronic suppurative otitis media

Introduction:

In chronic suppurative otitis media (CSOM), there may be inflammation in the mastoid cavity and the middle ear and there is discharge from the ear associated with the perforation of the

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tympanic membrane. [1] It is more common in the developing countries compared to the developed world. In the developing countries also, it is more common among those who belong to the lower social classes. Various factors contribute to the development of CSOM like lack of hygiene, repeated episodes of infection of the upper respiratory tract, overcrowding, malnutrition etc. It is more common in the rural areas compared to the urban areas. [2]

If the pars tensa of tympanic membrane is affected, it results in the tubotympanic type of CSOM. It is benign as there are no complications of it. If the pars flaccida is affected, it results in attico-antral type of CSOM. It is dangerous as sometimes it may be life threatening and found to be associated with complications. [3] Sometimes if not treated properly, the infection can spread to facial nerve, lateral sinus and other such vital structures leading to complications. [4] Hearing losses may occur in few chronic cases which are neglected. [5]

With the use of antibiotics, the complication rate due to CSOM has come down. But, irrational use can lead to the resistance to the antibiotics. Hence, proper, rational and judicious use of antibiotics in CSOM is required to prevent the multi-drug resistance and complications of the disease. [6]

In practical life, the indiscriminate use of antibiotics has lead to the variation in the antibiogram of organisms causing CSOM from time to time and from place to place. Therefore, it is necessary to continue reporting the microbiological pattern in cases with CSOM. Hence, present study was carried out to study the pattern and culture and sensitivity of microbes in patients with chronic suppurative otitis media.

Material and methods:

It was a hospital based cross sectional study carried out at department of Ear, Nose and Throat of Malla Reddy Institute of Medical Sciences, Hyderabad. The study was carried out over a period of six months from January 2023 to June 2023.

Based on a previous study it was observed that in 90% of the cases, the culture was positive in patients with CSOM. Based on this, taking proportion of 90% with 95% confidence level and 10% allowable error the sample size came out to be 45. But, in the present study, we were able to include a total of 70 cases.

Institution Ethics Committee permission was obtained. Written informed consent was taken from all eligible study participants. Those cases with signs and symptoms and confirmed diagnosis of CSOM were included in the present study. Those who used the antibiotics in the last 15 days were excluded.

A detailed history was recorded in the pre designed, pre tested, and semi structured study questionnaire. Detailed general examination, ENT examination was carried out as per the standard guidelines. The pus swab was collected with prior intimation to the patients as per the standard guidelines and it was sent to the Microbiology department for culture and sensitivity. The reports were collected and entered in the study questionnaire.

The data was entered in the Microsoft Excel worksheet and analyzed using the SPSS statistical software version 19. The data was expressed as proportions.

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 11, 2023

Results:

Table 1: Results of ear swabs

Results of ear swabs	Number	%
Only bacteria	40	57
Only fungal	6	8.5
Bacteria and fungi	14	20
No growth	10	14.3
Total	70	100

Among the 70 ear swabs, growth was seen in 85.7% of the cases. Only bacterial growth was seen in 57% of the samples while that of only fungi was seen in 8.5% of the cases. Both bacteria and fungi were seen in 20% of the cases. (Table 1)

Table 2: Bacterial isolates

Bacterial isolated	Number	%
Staphylococcus aureus	22	40.7%
Pseudomonas aeruginosa	15	27.7%
Klebsiella pneumoniae	6	11.5%
Escherichia coli	4	7.4%
streptococcus	2	3.7%
Proteus	2	3.7%
Total	54	100%

Among 54 bacterial isolates, most common was staphylococcus aureus in 40.7% of the cases followed by Pseudomonas aeruginosa in 27.7% of the cases. (Table 2)

Table 3: Fungal isolates

Fungi isolated	Number	%
Aspergillus species	12	60%
Candida species	8	40%
Total	20	100%

Among 20 fungal isolates Aspergillus species was seen in 60% of the cases and Candida species in remaining 40% of the cases. (Table 3)

Table 4: Results of culture and sensitivity

Organism	Antibiotics					
	Amoxycl av	Azithromy cin	Ceftazidi me	Piperici llin	Ciprofloxa cin	Gentami cin
Staphylococcus aureus (N=22)	8	5	2	0	2	5
Pseudomonas	0	0	7	5	3	0

ISSN:0975 -3583,0976-2833 VOL14, ISSUE 11, 2023

aeruginosa (N=15)						
Klebsiella pneumonia (N=6)	0	0	3	2	1	0
Escherichia coli (N=4)	1	2	0	0	0	1
Streptococcus (N=2)	1	0	1	0	0	0
Proteus (N=2)	0	0	1	0	1	0

Among 22 staphylococcus aureus, 8 were sensitive to amoxyclav, 5 were sensitive to azithromycin and Gentamicin respectively. Among 15 cases due to pseudomonas aeruginosa, 7 were sensitive to ceftazidime. Among six cases due to klebsiella, 50% were sensitive to ceftazidime. Among four cases due to Escherichia coli, 50% were sensitive to azithromycin. Among two cases due to streptococcus, one was sensitive to amoxyclav and one was sensitive to ceftazidime. Among two cases due to proteus, one was sensitive to ceftazidime. (Table 4)

Discussion:

Among the 70 ear swabs, growth was seen in 85.7% of the cases. Only bacterial growth was seen in 57% of the samples while that of only fungi was seen in 8.5% of the cases. Both bacteria and fungi were seen in 20% of the cases. Among 54 bacterial isolates, most common was staphylococcus aureus in 40.7% of the cases followed by Pseudomonas aeruginosa in 27.7% of the cases. Among 20 fungal isolates Aspergillus species was seen in 60% of the cases and Candida species in remaining 40% of the cases. Among 22 staphylococcus aureus, 8 were sensitive to amoxyclav, 5 were sensitive to azithromycin and Gentamicin respectively. Among 15 cases due to pseudomonas aeruginosa, 7 were sensitive to ceftazidime. Among six cases due to klebsiella, 50% were sensitive to ceftazidime. Among four cases due to Escherichia coli, 50% were sensitive to azithromycin. Among two cases due to streptococcus, one was sensitive to amoxyclav and one was sensitive to ceftazidime. Among two cases due to proteus, one was sensitive to ceftazidime.

Prakash R et al [7]studied 204 cases of CSOM for the microbiology. They found that the most common organism isolated was staphylococcus aureus in 48.7% of the cases followed by pseudomonas aeruginosa in 19.9% of the cases. These findings are similar to the findings of the present study. In their study, in 29.4% of the cases, anaerobes were identified. The fungi constituted 12.3% of the cases compared to 28.6% of fungi isolates in the present study. They found that amikacin was sensitive in 95.5% of the cases followed by ceftriaxone in 83.4% of the cases and Gentamicin in 82.7% of the cases.

Khatun MR et al [8]found that the culture positivity rate was 70.8% compared to 85.7% in the present study. In their study, 55% were gram negative, and 45% were gram positive organisms. Most common was staphylococcus aureus in 37% of the cases followed by pseudomonas aeruginosa in 31.5% of the cases. We also found that the most common bacteria isolated were staphylococcus aureus in 40.7% of the cases followed by Pseudomonas aeruginosa in 27.7% of the cases. They found that the gram positive organisms were 100% susceptible to linezolid and vancomycin followed by imipenem. The gram negative organisms were mostly susceptible to imipenem. The authors also noted that there was multi

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drug resistance to third generation cephalosporins, amoxicillin/clavulanate which was alarming.

Borligegowda V et al [9]observed that in 28% of the cases the fungi was isolated. We also found exactly that in the present study the fungi were isolated in 28.6% of the cases. Only bacteria were seen in 62% of the cases in which Pseudomonas aeruginosa was the most common in 37.2% of the cases followed by staphylococcus aureus in 29.9% of the cases. But, in the present study, we found reverse i.e. staphylococcus aureus more common than Pseudomonas aeruginosa. The authors found that most of the organisms were susceptible to amikacin.

Deb T et al [10]also found that Pseudomonas aeruginosa was more common than staphylococcus aureus. But, in the present study, we found reverse i.e. staphylococcus aureus more common than Pseudomonas aeruginosa. They reported that ciprofloxacin was sensitive in 26 isolates. The author concluded that pseudomonas was the most common in the causation of CSOM.

Agrawal A et al [11]reported that *Staphylococcus* species was seen in 37.6% of the cases he predominance by *Staphylococcus* species in 37.6% of the cases. We also found similar results. *Staphylococcus* species were highly susceptible to moxifloxacin, levofloxacin and doxycyline. *Pseudomonas aeruginosa* was 100% sensitive with colistin, polymyxin B, and carbapenems.

Conclusion:

Staphylococcus species is the major offending pathogen in CSOM and Amoxyclav followed by Gentamicin were found to be most effective antibiotic. The organisms are increasingly becoming resistant to common antibiotics, therefore swab from the discharging ear for culture and sensitivity to antibiotics is very important to select the appropriate antibiotic to prevent resistance.

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