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Original Research Article

Pattern and Culture and Sensitivity of Microbes in Patients with Chronic Suppurative Otitis Media at a Tertiary Care Center

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Abstract

Background: The use of antibiotics has reduced the number of complications associated with chronic suppurative otitis media (CSOM). However, irrational usage may lead to antibiotic resistance.
Antibiotic indiscriminate usage has resulted in variance in the antibiogram of organisms causing CSOM. The goal of this research is to look at the pattern and sensitivity of microorganisms in CSOM patients.
Methods: A hospital-based cross-sectional research was conducted on 70 CSOM patients. A detailed history, general examination, and ear examination were performed. A sample of pus was extracted and forwarded to the Microbiology section for culture and sensitivity testing. Reports were gathered and entered.
Results: Growth was seen in 85.7% of the 70 ear swabs tested. Only bacterial growth was seen in 57% of the cases, whereas only fungal growth was observed in 8.5%. Bacteria and fungus were found in 20% of the samples.Staphylococcus aureus was found in 40.7% of the 54 bacterial isolates, followed by Pseudomonas aeruginosa in 27.7%. Aspergillus was found in 60% of the 20 fungal isolates and Candida in 40%. Eight of the 22 staphylococcus aureus strains tested positive for amoxyclav. Seven of the 15 instances of pseudomonas aeruginosa were susceptible to ceftazidime. Ceftazidime was effective in 50% of the klebsiella patients. Half of the four E. coli infections tested positive for azithromycin.
Conclusion: Staphylococcus species is the most common pathogen in CSOM, and Amoxyclav was determined to be the most effective antibiotic, followed by Gentamicin. Because organisms are growing more resistant to popular antibiotics, a swab from the discharged ear for culture and antibiotic sensitivity is critical in order to pick the proper antibiotic to avoid resistance.

Introduction

In chronic suppurative otitis media (CSOM), there may be inflammation in the mastoid cavity and middle ear, as well as discharge from the ear due to tympanic membrane rupture. [1] It is more prevalent in poor nations than in the industrialised world. It is more widespread among persons from lower socioeconomic groups in emerging nations as well. Lack of cleanliness, frequent bouts of upper respiratory tract infection, overcrowding, hunger, and other factors all contribute to the development of CSOM. It is more frequent in rural settings than in metropolitan ones. [2]

The tubotympanic form of CSOM occurs when the pars tensa of the tympanic membrane is damaged. It is safe since there are no difficulties. If the pars flaccida is damaged, the CSOM becomes attico-antral. It is risky since it may occasionally be fatal and has been linked to problems. [3] If not treated appropriately, the infection may spread to the facial nerve, the lateral sinus, and other critical tissues, causing difficulties. [4] Hearing loss may develop in a few chronic instances that are ignored. [5] The use of antibiotics has reduced the number of CSOM complications. However, irrational usage may lead to antibiotic resistance. As a result, effective, reasonable, and prudent antibiotic administration in CSOM is necessary to avoid multi-drug resistance and clinical consequences. [6] In practise, indiscriminate antibiotic usage has resulted in variance in the antibiogram of microbes causing CSOM from time to time and location to location. As a result, in instances with CSOM, the microbiological pattern must be reported indefinitely. As a result, the current research was conducted to investigate the pattern, culture, and sensitivity of microorganisms in patients with chronic suppurative otitis media.

Methods and Materials

Hospital-based cross-sectional research was conducted at Department of Microbiology, MKCG Medical college and Hospital, Berhampur. The research was conducted over a six-month period, from January 2021 to June 2022. According to prior research, the culture in patients with CSOM was positive in 90% of the cases. Based on this, a sample size of 45 was calculated using a percentage of 90%, a 95% confidence level, and a 10% allowed error. However, in this research, we were able to incorporate a total of 70 instances. Permission was received from the Institutional Ethics Committee. All eligible research participants provided written informed permission. The current investigation comprised patients with CSOM signs and symptoms and a verified diagnosis. Those who had taken antibiotics during the previous 15 days were eliminated. The pre-designed, pre-tested, semi-structured research questionnaire included a full history. The normal procedures were followed for the detailed general checkup and ENT examination. The pus sample was taken with prior notification to the patients and forwarded to the Microbiology department for culture and sensitivity testing. The reports were gathered and incorporated into the research questionnaire. The information was imported into a Microsoft Excel spreadsheet and analysed using SPSS statistical software version 19. The information was presented in the form of proportions.

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

Growth was seen in 85.7% of the 70 ear swabs tested. Only bacterial growth was seen in 57% of the samples, whereas only fungal growth was observed in 8.5% of the instances. In 20% of the instances, both bacteria and fungus were found. (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%

Staphylococcus aureus was the most prevalent bacterial isolate 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%

Table 4: Results of culture and sensitivity

Organism	Amoxiclav	Azithromycin	Ceftazidime	Piperacillin	Ciprofloxacin	Gentamicin
Staphylococcus aureus (N=22)	8	5	2	0	2	5
Pseudomonas aeruginosa (N=15)	0	0	7	5	3	0
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

Eight staphylococcus aureus were responsive to amoxyclav, whereas five were sensitive to azithromycin and Gentamicin. Seven of the 15 instances of pseudomonas aeruginosa were

susceptible to ceftazidime. Ceftazidime was effective in 50% of the klebsiella patients. Half of the four E. coli infections tested positive for azithromycin. One of the two streptococcus cases was responsive to amoxyclav and the other to ceftazidime. One of the two proteus instances was sensitive to ceftazidime. (Table 4)

Discussion

Growth was seen in 85.7% of the 70 ear swabs tested. Only bacterial growth was seen in 57% of the samples, whereas only fungal growth was observed in 8.5% of the instances. In 20% of the instances, both bacteria and fungus were found. Staphylococcus aureus was the most prevalent bacterial isolate in 40.7% of the cases, followed by Pseudomonas aeruginosa in 27.7% of the cases. Among the 20 fungal isolates, Aspergillus species were found in 60% of the cases and Candida species in the remaining 40%. Eight staphylococcus aureus were responsive to amoxyclav, whereas five were sensitive to azithromycin and Gentamicin. Seven of the 15 instances of pseudomonas aeruginosa were susceptible to ceftazidime. Ceftazidime was effective in 50% of the klebsiella patients. Half of the four E. coli infections tested positive for azithromycin. One of the two streptococcus cases was responsive to amoxyclav and the other to ceftazidime. One of the two proteus instances was sensitive to ceftazidime. Prakash R et al [7] investigated 204 CSOM patients for microbiology. They discovered that staphylococcus aureus was the most often isolated bacterium in 48.7% of the cases, followed by pseudomonas aeruginosa in 19.9% of the cases. These results are comparable to those of the current investigation. Anaerobes were found in 29.4% of the patients in their investigation. In the current investigation, fungus accounted for 12.3% of the cases and 28.6% of the fungal isolates. They discovered that amikacin was sensitive in 95.5% of the instances, ceftriaxone was sensitive in 83.4% of the cases, and Gentamicin was sensitive in 82.7% of the cases. Khatun MR et al [8] discovered that the culture positive rate was 70.8%, but the current research revealed it to be 85.7%. In their investigation, 55% of the organisms were gramme negative, whereas 45% were gramme positive. Staphylococcus aureus was the most frequent pathogen in 37% of the cases, followed by pseudomonas aeruginosa in 31.5%. We also discovered that staphylococcus aureus was isolated in 40.7% of the cases, followed by Pseudomonas aeruginosa in 27.7% of the cases. They discovered that gram-positive organisms were completely sensitive to linezolid, vancomycin, and imipenem. Ipenem was largely effective against gram-negative bacteria. The scientists also reported worrying multidrug resistance to third generation cephalosporins, amoxicillin/clavulanate. Borligegowda V et al [9] discovered that fungus were identified in 28% of the cases. We also discovered that in the current investigation, fungi were identified in 28.6% of the cases. Only bacteria were found in 62% of the cases, with Pseudomonas aeruginosa being the most frequent in 37.2% of the cases and staphylococcus aureus being the second most prevalent in 29.9% of the instances. However, in the current investigation, we discovered that staphylococcus aureus was more prevalent than Pseudomonas aeruginosa. The majority of the organisms tested positive for amikacin, according to the researchers. Pseudomonas aeruginosa was discovered to be more frequent than Staphylococcus aureus by Deb T et al [10]. However, in the current investigation, we discovered that staphylococcus aureus was more prevalent than Pseudomonas aeruginosa. Ciprofloxacin was shown to be sensitive in 26 isolates. The author came to the conclusion that pseudomonas was the most prevalent cause of CSOM. Agrawal A et al [11] stated that Staphylococcus species was seen in 37.6% of the patients, with Staphylococcus species predominating in 37.6% of the cases. We discovered similar findings. Moxifloxacin, levofloxacin, and doxycyline were particularly effective against Staphylococcus species. Pseudomonas aeruginosa was completely resistant to colistin, polymyxin B, and carbapenems.

Conclusion

Amoxyclav, followed by Gentamicin, was shown to be the most efficient antibiotic against Staphylococcus species in CSOM. Because organisms are growing more resistant to popular antibiotics, a swab from the discharged ear for culture and antibiotic sensitivity is critical in order to pick the proper antibiotic to avoid resistance.

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