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ISOLATION AND ANTIMICROBIAL SENSITIVITY PROFILE OF BACTERIAL AGENTS IN CHRONIC SUPPURATIVE OTITIS MEDIA PATIENTS AT NIMS HOSPITAL, JAIPUR

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ABSTRACT

Aims: *Chronic suppurative otitis media (CSOM) is a prevailing and notorious infection in developing countries causing serious local damage and threatening complications. The purpose of the present study was to determine the microbiological profile and antimicrobial susceptibility pattern of isolates from discharge in CSOM.* ***Material And Methods****: This study included a total of 115 patients of CSOM with unilateral or bilateral discharge attending department of ENT in NIMS university hospital, Jaipur, India from September 2012 to August 2013. Samples were inoculated on blood and Mac Conkey agar for 24- 48 hrs and identification of organism was done by using standard biochemical reactions and antibiotic susceptibility testing done by using modified Kirby Bauer method as per CLSI guidelines.* ***Result****: Among 115 patients included in the study, most of the patients were between age group 11-20 years (39.13%). CSOM was found to be more common in male patients (61.73%) than in female (38.26%) patients. The most common organisms were: Pseudomonas aeruginosa (46.08%); Staphylococcus aureus (33.19%); Proteus species (6.95%); Escherichia coli (3.47%); Coagulase negative Staphylococcal species (5.21%); Klebsiella species, (2.60%); and Citrobacter (1.73%). According to antimicrobial susceptibility testing, Staphylococcus aureus was more sensitive to linezolid and vancomycin and majority of gram negative isolates were sensitive to meropenem.* ***Conclusion****: Knowledge of the pathogens responsible for CSOM and choice of suitable antibiotics according to susceptibility tests will guide the treatment thus reducing complications of CSOM and curbing resistance to antibiotics.*

KEY WORDS

CSOM, antimicrobial susceptibility pattern, drug resistance.

INTRODUCTION

Chronic suppurative otitis media (CSOM) is defined as chronic inflammation of middle ear cavity that may present with recurrent ear discharges through a tympanic perforation[1]. Chronic suppurative otitis media is one of the most common chronic diseases of childhood. It is one of the major causes of deafness in India. It is more common in the lower socioeconomic group [2]. Most of the studies on the microbiology of CSOM have revealed that the most common bacteria associated with CSOM are *Pseudomonas, Staphhylococcus aureus, Proteus and Klebsiella*[2]. The bacteria are uncommon in the skin of the external auditory canal, but in the presence of

trauma, inflammation or high humidity these may proliferate [3]. CSOM has received considerable attention, not only because of its high incidence and chronicity, but also because of issues such as drug resistance and ototoxicity with both topical and systemic antibiotics[4].

This study was done to find the local pattern of aerobic microbes and their antimicrobial sensitivity pattern in cases of CSOM and to provide a guideline for making a protocol for empirical antibiotic therapy [3].

MATERIAL AND METHODS

Sample collection

One hundred and fifteen patients with CSOM who presented to the Ear, Nose and Throat (ENT) department in NIMS HOSPITAL from September 2012 to August 2013 were prospectively studied. The discharge was either frankly purulent, muco-purulent, serous or blood stained on occasion. Detailed clinical history regarding unique identification number, name, age, sex, duration of discharge, other associated symptoms and antibiotic therapy were taken**.** Sterile cotton swabs were used to collect ear discharge from CSOM patients. Only those cases were selected who had not taken any treatment either systemic or local for the last 7 days [4].

Culture and identification-

Sterile cotton swabs were used to perform culture. Organisms were identified by using a battery of tests with standard procedures **[**4, 5, 6].

Antimicrobial sensitivity

Antimicrobial sensitivity testing for aerobic isolates was carried out by modified Kirby Bauer disc diffusion method on Muller Hinton agar. Results were interpreted in accordance with Clinical Laboratory and Standard Institute guidelines (CLSI) [7].

RESULTS

A total of 115 cases were randomly selected (n=115) in which males were 71 (83%) and females were 44 (61.73%). Higher infection rate was observed in age group 11-20 year followed by 21-30 year, <10 year, 31-40 year, 41-50 year, >50 year [**Table No. 1**]. Out of 115 patients, 57 (49.56%) had right, 34 (29.56%) had left and 24 (20.86%) had bilateral ear discharge [**Table No.2**]. The most common organism isolated was *Pseudomonas aeruginosa* followed by *Staphylococcus aureus* as shown in **Table No.3**.

In *Staphylococcus aureus*, 100% sensitivity was found with Linezolid and Vancomycin followed by Cefoperazone / Sulbactam, Amikacin, Clindamycin, Piperacillin / Tazobactam, Erythromycin and Ofloxacin as shown in **Table No.4**.

Gram negative bacteria showed maximum sensitivity to Piperacillin / Tazobactam followed by Amikacin & Cefoperazone / Sulbactam. Lesser sensitivity was observed with Ticarcillin / Clavulenic acid, Gentamycin & Ciprofloxacin. Least sensitivity was seen with Piperacillin & Cotrimoxazole as shown in **Table No.5**.

Table 1: Agewise distribution of patients (n=115)

Age	Number (%)
<10 year	14 (12.17%)
11-20 year	45 (39.13%)
21-30	40 (34.78%)
31-40	8 (6.95%)
41-50	7 (6.08%)
>50	1 (0.86%)

Table 2: Site distribution (n=115)

Site	Number (%)
Right	57 (49.56%)
Left	34 (29.56%)
Bilateral	24 (20.86%)

Table 3: Bacteriological profile of CSOM (n=115)

Bacteria	Percentage
P.aeruginosa	46.08%
S.aureus	33.19%
Proteus	6.95%
Coagulase negative Staphylococccus aureus	5.21%
E.coli	3.47%
Klebsiella	2.60%
Citrobacter	1.50%

Table 4: Antibiotic sensitivity pattern of Staphylococcus aureus

Antibiotics	Staphylococcus species
Vancomycin	100%
Linezolid	100%
Cefoperazone/ Sulbactum	85%
Amikacin	75%
Clindamycin	70%
Piperacillin /Tazobactam	60%
Erythromycin	45%
Ofloxacin	30%

Table 5: Antibiotic sensitivity pattern of Gram negative isolates

Antibiotics	E.coli	Klebsiella	Citrobacter
Piperacillin	75.5	56	38
Amoxicillin	54	28.5	44
Ciprofloxacin	84.5	70	71
Gentamycin	77	68.8	59
Cefoperazone/ sulbatum	98	72.5	78.5
Amikacin	95.5	85	79.5
Piperacillin/ tazobactam	90	71	81
Ticarcillin/ clavulanic acid	100	85.5	44

Table 6: Antibiotic sensitivity pattern of Pseudomonas spp. isolates

Antibiotics	Pseudomonas
Tobramycin	76.92%
Ticarcillin/Clavulanic acid	42.30%
Meropenem	69.23%
Ciprofloxacin	69.23%
Ceftazidime	38.46%
Cefoperazone sulbactam	53.84%
Aztreonam	84.61%
Amikacin	88.46%

DISCUSSION

Chronic suppurative otitis media (CSOM) and various complications associated with the disease such as irreversible local destruction of middle ear structures facial palsy, serious intracranial and extracranial complications are seen by the otologist, paediatrician and the general practitioner [2].

Early microbiological diagnosis ensures prompt and effective treatment to avoid such complications. High prevalence of culture positive cases of CSOM was seen in the present study. We found that the CSOM was more prevalent in the first and second decade of life and accounted for 51% of the cases. This finding corroborates well with the observations made by other researchers [8].

In our study, males were more commonly affected than females and which is in concordance with findings of Ahmad et al (1999)[9] in which males were 57.3% and females were 42.7% [4, 10].

In our study, CSOM was most prevalent in the age group 11-20 years followed by 21-30 years. Similar results were reported by Mansoor et al. (2009) [11], Wariso et al.(2006)[12] and Poorey et al.(2002)[13]. High prevalence of CSOM in children may be attributed to the fact that they are more prone to upper respiratory tract infections [14].

In the present study, the most common bacterial isolates were *Pseudomonas aeruginosa* (46.08%), *Staphylococcus aureus* (33.19%), *Proteus* species (6.25%), *Coagulase negative Staphylococcus aureus* (5.2%), *Escherichia Coli* (3.47%), *Klebsiella* (2.60%) and *Citrobacter* species (1.73%) which is similar to studies performed by Mansoor et al (2009)[11], Argeudas et al.(1994)[15] and Kenna et al. (1986)[16]. But in contrast Loy et al.(2002)[17] reported *Staphylococcus aureus* as the major causative agent[3]. The slight differences observed in the isolates and species may be because of geographical and/or ethnic variations [17].

Our finding is in tandem with the pattern of CSOM infection within the tropical region. It is seen that both gram positive and gram negative organisms are responsible for infection of middle ear [4].

Antibiotic susceptibility patterns serve as a useful guideline for choosing the appropriate antibiotic. In the present study, majority of gram positive isolates were more sensitive to Vancomycin & Linezolid followed by Cefoperazone / Sulbactam, Amikacin, Clindamycin & Piperacillin / Tazobactam. Gram negative isolates were more sensitive to Ticarcillin / Clavulenic acid followed by Piperacillin / Tazobactam and Cefoperazone/ Sulbactam. *Pseudomonas aeruginosa were* sensitive to carbapenems (Imipenem, Meropenem), Aztreonam and aminoglycosides (amikacin and gentamicin). It is supported by previous studies like Mansoor T et al (2009) [11]. Variation in sensitivity to antibiotics may have other mechanisms of resistance such as impermeability of outer membrane and or active efflux mechanism and there may be geographical variations.[3]

CONCLUSION

Continuous and periodic evaluation of microbiological pattern and antibiotic sensitivity of isolates is necessary to decrease the potential risk of complications by early institution of appropriate treatment. We believe that our data may contribute to an effective management of CSOM.

REFERENCES

1. Acuin J. Global burden of disease due to chronic suppurative otitis media: Disease, deafness, Deaths and DALYs Chronic Suppurative Otitis media-Burden of illness and Management Options. Geneva: World Health Organisation.; 9-23. (2012).
2. K Sanjay, Sharma R, Saxena A, Panndey A, Gautam P, Taneja V. Bacterial Flora of Infected Unsafe CSOM. Indian Journal of Otology; 18(4): 288-211. (2012).
3. Shrestha B L, Amatya R C M, Shrestha I, Ghosh I . Nepalese Journal of ENT Head and Neck Surgery. Microbiological Profile of Chronic Supperative Otitis Media; 2(2). (2011).
4. Malkappa K S, Kondapaneni S, Supam B R, Chakraverti K T, Study of bacterial isolates and their antibiotic susceptibility pattern in Chronic Supperative Otitis Media. Indian Journal of Otology; 18 (3): 136-139 (2012).
5. MacFaddin J. Biochemical tests for identification of Medical Bacteria. 3rd ed. Philladelphia : Lippincott Williams and Wilkins; (1976).
6. Forbes BA, Sahm DF, Weissfeld AS. Bailey and Scott's Diagnotic Microbiology. 10th ed. St Louis, Missouri, USA: Mosby Inc.; (1998).

7. Nationonal Commetee for Clinical Laboratory Standards. Performance Standards for Antimicrobial susceptibility Testing. Wayne , PA, USA : NCCLS.; p M100-S1 (2001)
8. Prakash R, Juyal D, Negi V, Pal S, Adekhandi S , Sharma M et al. Microbiology of Chronic supperative Otitis Media in a Tertiary Care Setup of Uttrakhand State ,India. North American Journal of Medical Sciences; .5(4):281-284. (2013).
9. Ahmed A, Usman J Hashim R. isolates from chronic supperative otitis media and their antimicrobial sensitivity. Pak Armed forces Med J; 49:82-5. (1999).
10. Shazia Parveen. S and Janardhan Rao R. Aerobic bacteriology of Chronic Suppurative Otitis Media (CSOM) in a teaching hospital. Journal of Microbiology and Biotechnology Research; 2(4):586-589. (2012).
11. Mansoor T, Musani MA, Khalid G,Kamal M. Pseudomonas aeruginosa in chronic supperative otitis madia : sensitivity spectrum against various antibiotics in Karachi. J Ayub Med coll Aottaabad; 21(2): 120-23(2009).
12. Wariso BA, Ibe SN. Bacteriology of chronic discharging ears in Port Harcourt, Nigeria. West Afr J Med; 25: 219-22. (2006).
13. Poorey VK and Layer A. Study of bacterial flora in CSOM and its clinical significance.Indian J Otolaryngol Head Neck Surg; 54:91-5. (2002).
14. Argeudas A, Loaiza C, Herrerra JF, Mohs E. Antimicrobial therapy for children with chronic suppurative otitis media without cholesteatoma. J Pediatr Infect Dis; 13: 872-82. (1994).
15. Kenna MA, Bluestone CD, Reily JS, Lusk RP. Medical management of chronic suppurative otitis media without cholesteatoma in children. Laryngoscope 96; 146-511. (1986).
16. Loy AH, Tan AL, Lu PK. Microbiology of chronic suppurative otitis media. Singapore Med J; 43: 296-9. (2002).
17. Suhail Z, Ashrafi A K, Malik Iqbal S S, Khambaty Y, Khan A F, Sajjad Qaiser MS, Microorganism and Anti-Microbial Resistance of Bacterial Agents in Chronic Suppurative Otitis Media Patients at Abbasi Shaheed Hospital. Pakistan Journal of Otolaryngology; 28: 92-94. (2012).

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