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Evaluation on Bacteriological Profile of Chronic Suppurative Otitis Media in Eastern Bihar

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ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is defined as persistent or intermittent infection of ear for more than three months duration where the infected discharge occurs through the perforated tympanic membrane caused by bacteria ,fungi and virus resulting in inflammation of mucosal lining that results in partial or total loss of the tympanic membrane and ossicles. **Methods:** A total of 66 patients with symptoms of CSOM were enrolled in the study. Out of 66 patients, 54 were unilateral cases and 12 were bilateral cases. Thus the total 78 samples were available for culture. Samples from 78 discharging ears were collected with the help of aural speculum by swabbing the discharging ears with two sterile cotton swabs.**Results:** Antimicrobial susceptibility testing was carried out for all the isolates. Imipenem resistance was not seen to any of the isolate. Amikacin was the most effective antibiotic in the present study. It was effective against maximum number of strains 74 (94.9%) followed by levofloxacin 72 (92.3%), Gentamicin 70 (89.7%), Ofloxacin 68 (87.2%) and Ciprofloxacin 62 (79.5%).**Conclusion:**The chronic suppurative otitis media has become public health importance in the present days in developing countries like India. It is well known disease of multiple etiology and its recurrence and persistence. Irregular, haphazard and indiscriminate use of antibiotics has precipitated the emergence of multi resistant bacteria. The most common the bacteriological agent associated with CSOM in our area was Pseudomonas aeruginosa with a gradual decline in their sensitivity pattern to a number of fluoroquinolones. Amikacin and levofloxacin has proven to be the drug of choice.

Keywords: Chronic suppurative otitis media, bacteria and antibiotics.

INTRODUCTION

Chronic suppurative otitis media(CSOM) is defined as persistent or intermittent infection of ear for more than three months duration where the infected discharge occurs through the perforated tympanic membrane caused by bacteria ,fungi and virus resulting in inflammation of mucosal lining that results in partial or total loss of the tympanic membrane and ossicles.[1] Otitis media is an inflammation of the middle ear that affects the tympanic membrane.[2] It is a disease of multiple etiology and pathogenesis of otitis media are multifactorial including genetic predisposition, infections, allergy, environmental, social and racial factors and eustachian tube dysfunction.[3] There are three common types of otitis media, acute purulent otitis media, otitis media with effusion and chronic suppurative otitis media.[4] Chronic Suppurative Otitis Media (CSOM) is a chronic inflammation of middle ear and mastoid cavity that may present with recurrent ear discharges or otorrhoea through a tympanic perforation.[5] It is one of the most common diseases of all age groups, especially of childhood and is prevalent in developing countries.[6] Chronic suppurative otitis media (CSOM) and its complications are the bugbear of the otologists, paediatricians and general practitioners. It is a disease of multiple etiologies and is well known for its persistence and recurrence in spite of treatment.[7] CSOM - Chronic inflammation of middle ear and mastoid process with perforated tympanic membrane and ear discharge.[8] Destructive and persistent disease with irreversible sequelae and can proceed to serious intra or extra cranial complications.[9] Cholesteatoma is post inflammatory pseudo tumor which is always a consequence of CSOM.[10] Disease of multiple etiologies well known for its persistence and recurrence in spite of treatment.[11] There are 3 types of CSOM based on perforation of middle ear; Tubotympanic, Atticoantral and Marginal.[10] It is the single major cause of conductive deafness and 1.5% of speech disorders.1 The complications occur frequently because of close the relation of middle ear, cleft to facial nerve, auditory labyrinth, lateral sinus and middle and posterior cranial fossae makes it.[12] The later type of CSOM can cause severe adverse effects like intra and extracranial complications which can be life threatening. The complications of CSOM can be

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prevented to a greater extent by the judicious use of antibiotics. Due to the recurrent nature of the disease and the development of drug resistant pathogenic organisms, the control of infection poses a great therapeutic challenge. The knowledge of bacteriological profile helps in appropriate management of the cases. Hence this study was carried out to know the bacterial etiology of CSOM and their antibiotic susceptibility pattern. This present study was carried out to know the bacteriological profile of CSOM and to evaluate their antibiotic susceptibility pattern.

MATERIALS AND METHODS

This present study was conducted in the Department of Microbiology, Sarjug Dental College & Hospital, Darbhanga, Bihar. Patients presenting with chronic or recurrent ear discharge and on clinical examination found to have discharging ears with perforation of the tympanic membrane were included in the study. A total of 66 patients with symptoms of CSOM were enrolled in the study. Out of 66 patients, 54 were unilateral cases and 12 were bilateral cases. Thus the total 78 samples were available for culture. Samples from 78 discharging ears were collected with the help of aural speculum by swabbing the discharging ears with two sterile cotton swabs. The swabs were sent to the Microbiology laboratory without delay. The first swab was used for direct Gram stain and the second swab was cultured on Blood agar and Macconkey's agar plates and incubated at 370C for 24 -48 hrs. The isolates grown were identified by their cultural characteristics, morphology and biochemical reactions.[13]Antibiotic susceptibility testing of the organisms was done by Kirby Bauer method in Muller Hinton agar. The plates were read after overnight incubation at 370C by measuring the zone of inhibition around the antibiotic discs as per CLSI (Clinical Laboratory Standards Institute) guidelines.[14]

RESULTS&DISCUSSION

This present study was carried out in the Department of Microbiology, Sarjug Dental College & Hospital, Darbhanga, Bihar and of various service hospitals where the author was posted during the period from May 2016 to April 2018. A total of 66 patients with symptoms of CSOM were enrolled in the study. Their ages ranged from 4 years to 65 years. 54 cases were unilateral and 12 were bilateral cases. Out of 78 samples cultured, 73 (93.6%) showed microbial growth while 5 (6.4%) had no growth. Among the 73 samples with growth, 69 (88.5%) samples showed growth of single isolates while 4 (5.1%) showed mixed isolates. Out of 78 culture smears, 64 (82.05%) were Gram negative and 14 (17.9%) were Gram positive. [Table 2] shows the frequency of Distribution of bacterial species associated with CSOM patients.

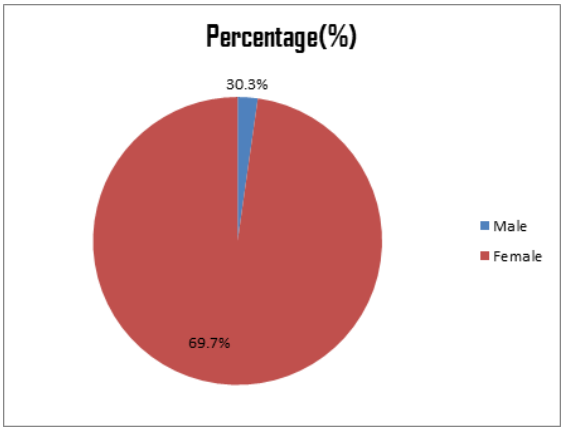

Figure 1: Shows the Sex Distribution of Cases.

Table 1 : Showing age distribution:

Age in Years	Number of cases	Percentage (%)
<10	19	28.8
11-20	13	19.7
21-30	17	25.75
31-40	05	7.6
41-50	07	10.6
51-60	04	6.06
61-70	01	1.51
>70	0	0.0

Table 2: Distribution of bacterial species associated with CSOM patients.

Bacterial isolates		No. of isolates (%)
Gram positive isolates	Staphylococcus aureus	10(12.8)
	Coagulase negative Staphylococcus	04(5.1)
Gram negative isolates	Pseudomonas spp.	31(39.7)
	Escherichia coli	25(32.05)
	Klebsiella pneumonia	06(7.7)
	Proteus spp.	02(2.6)

Table 3: Antibiotic susceptibility pattern of CSOM isolates

Antibiotics	No. of susceptible strains (%)
Amikacin	74 (94.9%)
Gentamicin	70 (89.7%)
Levofloxacin	72 (92.3%)
Ofloxacin	68 (87.2%)
Ciprofloxacin	62 (79.5%)
Cefoperazone	52 (66.7%)
Co-trimoxazole	47 (60.2%)
Cefotaxime	42 (53.8%)
Imipenem	78 (100%)

Antimicrobial susceptibility testing was carried out for all the isolates. Imipenem resistance was not seen to any of the isolate. Amikacin was the most effective antibiotic in the present study. It was effective against maximum number of strains 74 (94.9%) followed by levofloxacin 72 (92.3%), Gentamicin 70 (89.7%), Ofloxacin 68 (87.2%) and Ciprofloxacin 62 (79.5%). CSOM is a middle ear disease affecting leading to considerable morbidity by causing hearing loss; and even life threatening complications like mastoiditis, meningitis and brain abscess, if left untreated over long periods of time. The present study showed that 46 (69.7%) were male and 20 (30.3%) were female patients. Okesola and Fasina,[15] Akingbade et al and Shrestha et al,[16,17] studies also demonstrated more males than females. The male preponderance may be due to decreased attention to personal hygiene thus increased vulnerability of the male child to pathogens. Majority of the patients were below 10 years of age this finding agrees with the fact that CSOM is predominantly a childhood disease, particularly the under 10. This is partly because the immune system of children is not well developed compared to adult. Among the 78 samples with growth, 73 (93.6%) samples showed growth of single isolates, which is similar to the previous study by Agarwal et al.[18] In present study, no growth was seen in five (6.4%) samples. Vijaya et al also found 5.28% sterile samples in their study.[19] In our study, P. aeruginosa (39.7%) has the highest prevalence of the isolated organism. Many of the previous studies showed Pseudomonas to be the most common bacteria isolated from CSOM cases.[20-22] The predominance of Pseudomonas could be attributed to its higher adaptation ability compared to other organism. S. aureus (12.8%) was the second highest isolate in this study which is similar to the study done by Kazeem MJ, Aiyeleso R and Oni et al.[23,24]The other isolated organisms in our study are E. coli and Klebsiella pneumoniae. This is similar to study by Loy et al.[25] Antibiotic susceptibility pattern was tested for all the isolated organisms. Imipenem resistance was not seen to any of the isolate. These drugs are considered as reserve drugs and should not be used primarily. Amikacin was the most effective antibiotic next to imipenem in the present study. It was effective against maximum number of strains 74 (94.9%) followed by levofloxacin 72 (92.3%) and Gentamicin 70 (89.7%). Fluoroquinolones such as ciprofloxacin, ofloxacin and levofloxacin are generally used for the treatment of Pseudomonas infections. But, sensitivity of these drugs is seemed to be gradually dropping probably because of widespread self-medication due to availability of these drugs over the counter in developing countries like India.

CONCLUSION

These findings conclude that, the chronic suppurative otitis media has become public health importance in the present days in developing countries like India. It is well known disease of multiple etiology and its recurrence and persistence. Irregular, haphazard and indiscriminate use of antibiotics has precipitated the emergence of multi resistant bacteria. The most common the bacteriological agent associated with CSOM in our area was Pseudomonas aeruginosa with a gradual decline in their sensitivity pattern to a number of fluoroquinolones. Amikacin and levofloxacin has proven to be the drug of choice. The knowledge of the etiological agents causing CSOM and their antimicrobial susceptibility pattern is of great importance for an effective treatment and prevention of complications.

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