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EXPLORATION OF PATTERN OF BACTERIOLOGICAL ISOLATE AND THEIR ANTIBIOTIC SENSITIVITY FROM EAR DISCHARGE: A RECORD BASED ANALYSIS

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ABSTRACT

Introduction: Chronic suppurative otitis media (CSOM) is a leading cause of ear morbidity ranging from mild discomfort to preventable hearing loss. Due to changing sensitivity pattern its management particularly in resource limited setting possess a challenge. However, local knowledge of sensitivity pattern can guide therapeutic decision. Therefore, we aimed to document most common organism isolated from CSOM patients and their antibiotic sensitivity pattern.

Methods & Results: The data for analysis was retrieved from a register at Microbiology Laboratory of a tertiary health center. The swab collected for CSOM patients over the period of one year from April 2010 to March 2011 were analyzed. The most common organism isolated was Staphylococcus followed by pseudomonas species. The Staphylococci were most sensitive to Fluroquinoles and Amikacin but were highly resistant to Ampicillins.

Conclusion: Use of fluroquinolones and amikacin antibiotic among CSOM patients in this area is more likely to give favorable clinical outcome. However, there is a need of larger community based studies to document the most common organism and their sensitivity pattern in this part of India.

KEYWORDS : CSOM, ENT, India, Treatment

Introduction:

Otorrhea is common complaint in Ear, Nose & Throat Clinics globally. Diseases which are mainly responsible for otorrhea are otitis externa, Acute Otitis Media and Chronic Otitis Media (CSOM). CSOM is associated with serious complications like hearing impairment, brain abscess, etc. [1] It is the leading cause of preventable hearing loss globally especially in developing countries. [2] It is an important cause of under five mortality also. Therefore, it attributes to significant morbidity and mortality.

As per WHO estimates India belongs to high CSOM burden country with prevalence of about 2%-4%. [1] Therefore, high burden of CSOM and its association with hearing impairment, death, and severe disability together with the high cost incurred in its management, make CSOM a significant health problem in developing countries.

Management of CSOM mainly relies on antibiotic. However, due to abuse and misuse of antibiotics resistance has increased. A review of recent literature shows that though the causative agents of this disorder have not changed much over the years, the antibiotics sensitivity pattern of these bacteria has changed tremendously. [3]

The polymicrobial nature of infection together with changing pattern of sensitivity warrants culturally directed treatment. However, the management of such patients poses challenges especially in setting with limited laboratory facilities. Studies have been done in India to document the pathogens involved in ear discharge and had reported their sensitivity as well. However, it has been observed that sensitivity pattern is influenced by local conditions like climate, geography, local prescription pattern, prevalence of resistant strain etcetera. [4] Thus, knowledge of local antibiotic sensitivity pattern of micro flora of ear discharge could help in guiding treatment protocol. Therefore, we aimed to document the current bacteriology of ear discharge and the sensitivity pattern of these microbes in our patient sample in this part of India.

Material and Methods:

The study was conducted at the Department of Microbiology, Rajendra Institute of Medical Sciences (RIMS), Ranchi, India. RIMS, is a 1500 bedded teaching institute and tertiary care centre which caters the patients of all age group. It is a premiere institute of Jharkhand state, India and serves the majority of population in the state.

The laboratory records of ear swab of the patient of CSOM with draining ear were analyzed retrospectively. The data regarding diagnosis, test date, culture results and sensitivity pattern were available and were retrieved. The analysis was done for swab collected for CSOM patients over the period of one year from April 2010 to March 2011. The laboratory scientist provided the information regarding detailed procedure employed for the same. Ear swab was collected as per standard guidelines from patients. Prior to collection of sample it was made sure that no antibiotics or other therapeutic agent was applied in the aural region for about three hours prior to sampling. A sterile swab was placed into the outer ear and gently rotated to collect the purulent discharge. It was then inoculated into a different media like Blood Agar, Chocolate Agar, MacConkey's Agar plates. Inoculated primary plates were incubated at 37^0 C for 48 to 72 hours. The plates were examined daily for 72 hours before reporting it as negative. Any growth on the above mentioned media were identified on the basis of their colony morphology, cultural characteristics and biochemical reactions according to standard techniques. [5]

Two slopes of Sabouraud′s dextrose agar were inoculated and one tube was incubated at 37^0C and the other at 25^0C for 4 weeks. They were examined once a week and discarded if there was no growth after 4 weeks. Antibiotic susceptibility testing was done by standard Kirby Bauer disk diffusion method and controls were put up according to Clinical and Laboratory Standard Institute (CLSI) guidelines. Data was entered in excel spread sheet and doubly checked for any error and was analyzed by SPSS version 13 for windows. The results were presented as proportions.

Results:

A total of 64 patients underwent swab culture for CSOM during the one year period from March 2010 to April 2011. Around 78% (50/64) revealed growth of single organism while only 6% (4/64) showed mixed, rest of the samples were either sterile or grown normal commensals**. [Table1]** Overall Staphylococcus aureus 53% (34/64) was the commonest organism found followed by Pseudomonas sps. (13/64). **[Table2]**

Sensitivity pattern:

Staphylococcus aureus showed high levels of susceptibility to amikacin (18/35) 51.4% and gatifloxacin (11/35) 31.4%. However, high resistance rates were documented for ampicillin (25/40) 71.4% and cefotaxime (14/35) 40%. Pseudomonas sps exhibited resistance to cephelaxin (11/13) 84.6% and ampicillin (8/13) 61.5%. However, most of the isolates were highly sensitive to amikacin (10/13) 76.9% and levofloxacin (8/13) 61.5%.

The overall antimicrobial susceptibility showed that organisms were highly sensitive to amikacin (29/64) 45.3% followed by levofloxacin (26/64) 40.6% and gatifloxacin (15/64) 23.4%. However, resistance was documented maximum for ampicillin (37/64) 57.8% followed by cephalexin (30/64) 46.9% and erythromycin (23/64) 35.9%.

Discussion:

In the current study, Staphylococcus was the most common organism found and the overall antimicrobial susceptibility pattern of organism showed that they were highly sensitive amikacin (29/64) 45.3% followed by levofloxacin (26/64) 40.6% and gatifloxacin (15/64) 24%. However, study has few limitations like data about demographic variables were not maintained in laboratory registers. Therefore, we could not document the association between these variables and culture results which are important not only for epidemiological purpose but also for management of cases as well.

In our study, Staphylococcus aureus showed high resistance to ampicillin which in consistent with the studies reported from other developing countries like Pakistan and Ethopia and Uganda [6,7] It has been reported that Staphylococcus are highly sensitive to fluroquinoles antibiotics and resistant to ampicillin the same finding was also found in current study.[7,8]

Overall, Pseudomonas species are reported to be the most common microbes causing CSOM. However, Staphylococcus was the most common organism isolated in our study. The study finding is consistent with study report of other study. [9]

We could not document the association of demographic factor, the type of CSOM and other important variables which could explain difference in findings. Moreover, we did not intend to explore and analyze factors for bacteriological profile of ear discharge. It was just a descriptive study to document bacterial isolates from ear swabs.

CONCLUSION

Therefore, we conclude that antibiotic prescription consisting amikacin and/ or fluroquinolones are likely to give best clinical outcome if used for the treatment of CSOM in this area and the ampicilllin group of drugs are likely to be of no clinical benefit and should be avoided. But, we stress upon the fact that the standard protocol of treatment after culture and sensitivity report should be followed wherever feasible and empirical treatment should be considered only in resource poor setting as suggested earlier in view of rising antimicrobial resistance. However, there is a need of larger community based studies to document the most common organism and their sensitivity pattern in this part of India.

Table1: Number of microorganism per culture (n=64)

No. of microorganism per culture	Number of cultures (%)
One	50 (78.1)
Two	4 (6.3)
Normal Flora	3(4.7)
No Growth	7(10.9)

Table 2: Spectrum of microorganism cultured (n=54)*

Micro Organism	Number of cultures (%)
Staphylococcus Aureus	34(53.1)
Pseudomonas sps	13(20.3)
Klebbsiela sps	2(3.1)
Micrococcus	2(3.1)
Candida sps	2(3.1)
Trichophyton sps	1(1.6)

*Normal flora and No Growth excluded

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