BACTERIOLOGICAL PROFILE OF CHRONIC SUPPURATIVE OTITIS MEDIA CASES AT A TERTIARY CARE CENTRE IN KARNATAKA

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ABSTRACT

Chronic Suppurative Otitis Media (CSOM) is one of the most common chronic diseases of childhood. It is one of the common causes of deafness and can also cause permanent perforation.

AIM

This study was carried out to know the bacterial aetiology of CSOM and their antibiotic susceptibility pattern.

MATERIALS AND METHODS

Hundred patients with symptoms of CSOM who were not on antibiotics were included in the present study. Gram stain, culture and sensitivity and biochemical reactions were carried out to identify the organism and to assess their antibiotic susceptibility pattern.

RESULTS

The most common organism isolated in this study was Staphylococcus aureus (45.6%) followed by Pseudomonas aeruginosa (34.7%), Klebsiella pneumoniae (6.5%), Proteus mirabilis (4.3%), Enterococcus fecalis (2.1%), Citrobacter koseri (2.1%), Acinetobacter baumannii (2.1%) and Bacteroides (2.1%). Staphylococcal isolates showed highest susceptibility to commonly used antibiotics, gentamycin, ciprofloxacin. Most of the gram negative isolates showed susceptibility to amikacin, ciprofloxacin, third generation cephalosporins.

CONCLUSION

The study of microbial pattern and their antibiotic susceptibility determines the prevalent bacterial organisms causing CSOM in local area and helps to decide empirical treatment of otitis media and its complications for successful outcome, thus to prevent the emergence of resistant strains.

KEYWORDS

Chronic Suppurative Otitis Media, Staphylococcus Aureus, Pseudomonas Aeruginosa, Antibiotic Susceptibility.

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INTRODUCTION

Ear is considered as an imperative sensory organ of human beings. Ear infections are a commonly encountered entity in routine clinical practice. Those infections arise from the external auditory meatus as in otitis externa or in middle ear causing a Chronic Suppurative Otitis Media (CSOM). Chronic suppurative otitis media is one of the most common chronic diseases of childhood and one of the major causes of deafness in India.[1]

Chronic suppurative otitis media is a chronic inflammation of middle ear due to various causes. It is notorious for its recurrence, persistent infection and involvement in causing permanent perforation. CSOM occurs due to various reasons. The disease usually occurs after upper respiratory viral infections followed by invasion of pyogenic organisms.[2]

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It is a condition of the middle ear that is characterised by persistent or recurrent discharge through a chronic perforation of the tympanic membrane. Due to the perforated tympanic membrane, bacteria can gain entry into the middle ear via the external ear canal. Infection of the middle ear mucosa subsequently results in ear discharge. Untreated cases of CSOM can result in a broad range of complications. These may be related to the spread of bacteria to structures adjacent to the ear or to local damage in the middle ear itself.

Such complications range from persistent otorrhoea, mastoiditis, labyrinthitis and facial nerve paralysis to more serious intracranial abscesses or thrombosis.[3] Hence this study was carried out to identify the bacterial aetiology of CSOM and their antibiotic susceptibility pattern. This knowledge is significant for the clinicians for appropriate management of the cases and to prevent or curtail the occurrence of complications.

MATERIALS AND METHODS

This study was carried out in a tertiary care hospital in Bangalore from June 2014 to August 2015. Hundred patients with symptoms of CSOM who were not on antibiotics were included in the study. Ear discharge were collected from them under strict aseptic precautions using two sterile cotton swabs with the assist of aural speculum and processed immediately

in the microbiology laboratory. The first swab was used for direct Gram stain and the second swab was cultured in Blood agar and MacConkey agar plates and incubated at 37^{0}C for 24–48 hrs. and Blood agar plates were provided with 5-10% CO_2. Simultaneously samples were inoculated in Brucella blood agar and incubated anaerobically. The isolates grown were identified by their cultural characteristics, morphology and biochemical reactions. Antibiotic susceptibility testing of the organisms diagnosed was done by Kirby Bauer method in Mueller Hinton agar. The plates were read after overnight incubation at 37^{0}C by measuring the zone of inhibition around the antibiotic discs as per CLSI (Clinical Laboratory Standards Institute) guidelines.

RESULTS

A total of 100 patients were included in the study, out of which 52% were males and 48% were females (Table 1). Out of total cases included, 74 of them were paediatric cases and rest belonging to adult age group (Table 2). Among 100 samples 82 were culture positive (Figure 1), out of which 10 cases yielded polymicrobial culture and 72 monomicrobial culture (Figure 2).

The most common organism isolated in this study was Staphylococcus aureus (45.6%) followed by Pseudomonas aeruginosa (34.7%), Klebsiella pneumoniae (6.5%), Proteus mirabilis (4.3%), Enterococcus fecalis (2.1%), Citrobacter koseri (2.1%), Acinetobacter baumannii (2.1%) and Bacteroides (2.1%) (Figure 3). Antibiotic susceptibility of the organisms was as per Figures 4 and 5.

DISCUSSION

CSOM is one of the common ear infections, which are usually reported from rural population and lower socio-economic status group. It is a chronic infection of middle ear, which can even lead to deafness. Poorly treated or untreated CSOM can lead to many serious complications. Hence, diagnosis of the causative organism is necessary for proper management of CSOM cases.

In our study, CSOM was found to be more prevalent in paediatric age group. This is in accordance with studies done by Aravind N et al.[4] Shrestha BL et al.[5] and other studies. The high incidence of CSOM in this age group is due to short and wider Eustachian tube and the practice of mothers' breastfeeding the child in supine position.

In our study, incidence of CSOM in male patients was found to be higher than females. This is in accordance with studies by Arti Agrawal et al.[6] and Shrestha BL et al.[4]

The bacteriological agents in our study were found to be of monomicrobial entity in 87.8% of cases and polymicrobial in 12.2% of cases. The causative agents were Staphylococcus aureus (45.6%) followed by Pseudomonas aeruginosa (34.7%). This is similar to the study done by Lakshmi et al. which reported Staphylococcus aureus isolates of (41.25%) and Pseudomonas isolates of (37.5%).[2] Similar results are seen in study conducted by Kucchal et al.[7] and Yousuf A et al.[3] Other isolates were mostly of Gram negative bacilli with Klebsiella pneumoniae (6.5%), Proteus mirabilis (4.3%) and Citrobacter koseri and Acinetobacter baumannii (2.1% each). Rest (4.2%) of isolates were found to be Enterococcus faecalis and Bacteroides. This is in accordance with various other studies as by Arti et al.[6]

An associated fungal aetiology was noticed in three cases, i.e. Candida albicans in two and Aspergillus niger in one case.

Even though the incidence of complications is low in CSOM cases, care must be taken while treating a patient with active CSOM. Treatment hence needs to be instituted early and effectively to avoid such complications. The mainstay of treatment for uncomplicated CSOM is twofold: meticulous aural toilet (With suction/mopping up of ear debris and discharge) and instillation of a topical and systemic antimicrobial agent. The therapeutic use of antibiotics is usually started empirically prior to results of microbiological culture. Selection of any antibiotic is influenced by its efficacy, resistance of bacteria, safety, risk of toxicity and cost.

Antibiotic susceptibility pattern was assessed for all the isolates. Staphylococcal isolates showed highest susceptibility to commonly used topical antibiotics, gentamycin and ciprofloxacin as well as to linezolid and erythromycin (Table 4). Most of the gram negative isolates showed susceptibility to amikacin and ciprofloxacin. Also they were fairly susceptible to third generation cephalosporins (Table 5). But a 79% resistance was noticed to amoxiclav, which is in accordance with the studies by Prakash M et al.[2] and Chakraborthy et al.[8]

Previously amoxicillin/ampicillin were used frequently more than quinolones for acute and chronic middle ear infections in our setup. But the present study has clearly revealed a changing behaviour of micro-organisms showing more sensitivity to quinolones, cephalosporins and gentamycin. Also the clinicians used to avoid the quinolones due to their adverse effects on cartilage in growing children after prolonged usage. However, it has been documented that quinolones can be used if required in children without any apprehensions. So the use of ciprofloxacin has been found superior, both empirically and topically.

No MRSAs were isolated in our study. One important fact to be kept in mind is that the antibiotic susceptibility pattern of the CSOM causing organisms keeps changing. Hence, routine antibiotic susceptibility testing before treatment is recommended.

CONCLUSION

The common pathogen causing CSOM in our hospital was Staphylococcus aureus followed by Pseudomonas aeruginosa. A changing antibiotic susceptibility pattern was noticed. So it is necessary to perform a routine antibiotic surveillance for proper management of cases.

Sex	Number
Male	52
Female	48
Total	**100**

Table 1: Distribution of Gender Among Cases Studied

Age	Number
Paediatric	74
Adult	26
Total	**100**

Table 2: Distribution of Cases among Adult and Paediatric Age Group

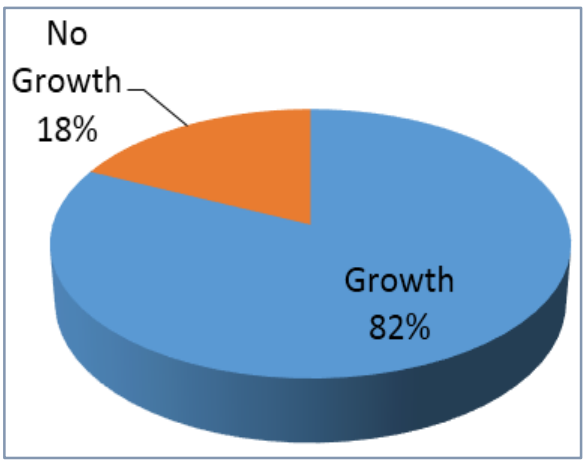

Fig. 1: Distribution of Isolates obtained in our Study

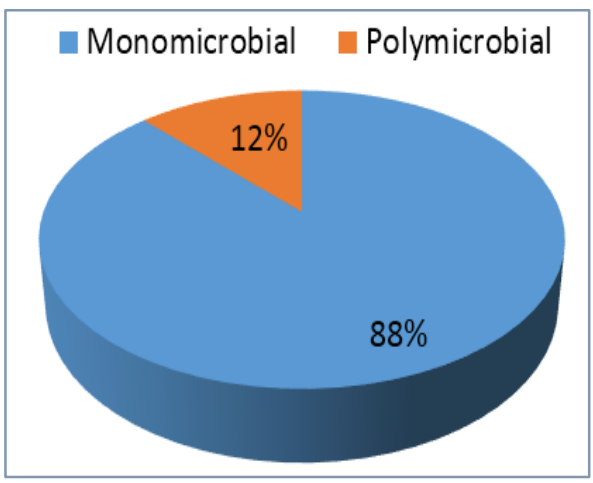

Fig. 2: Profile of Infection among Cases Studied

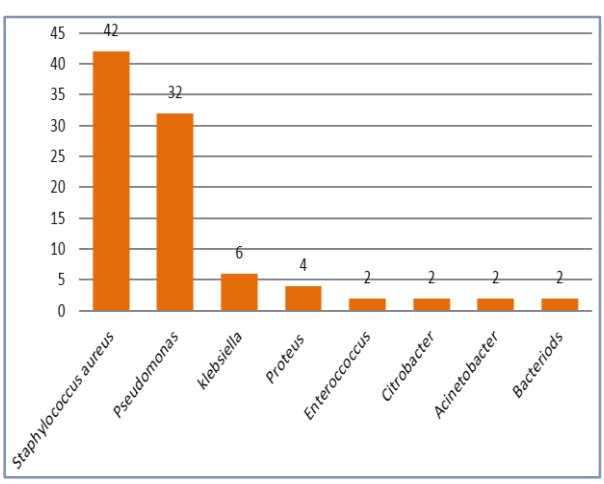

Fig. 3: Distribution of Organisms isolated in our Study

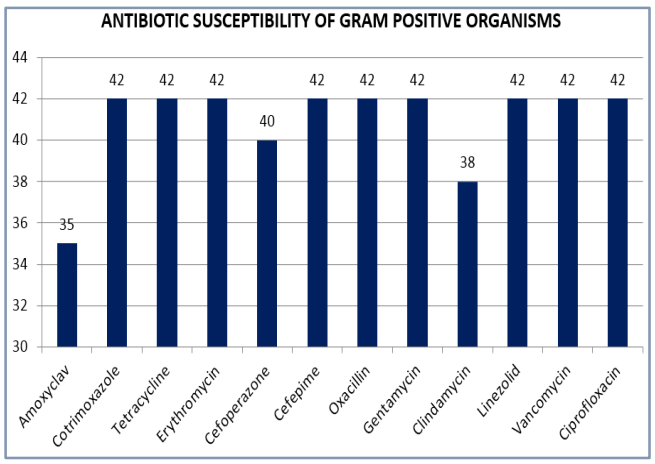

Fig. 4: Antibiotic susceptibility pattern of Gram positive isolates

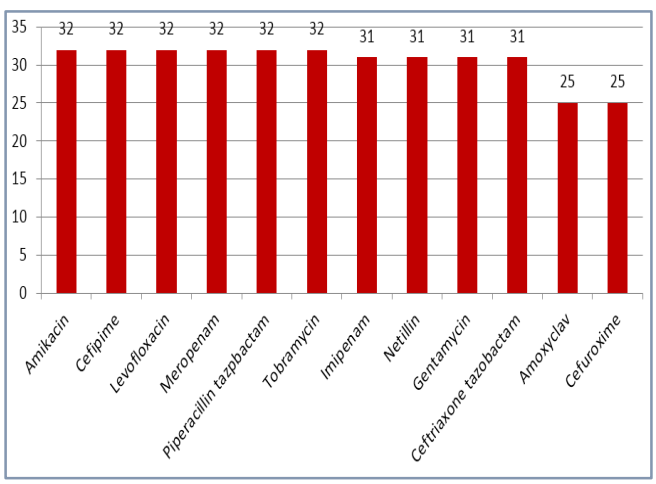

Fig. 5: Antibiotic susceptibility pattern of Gram Negative isolates

REFERENCES

1. Raakhee T, Unguturu Sreenivasa Rao. Bacteriological study of discharging ear in patients attending a tertiary care hospital. International Journal of Research in Medical Sciences 2014 May;2(2):602-606.
2. Prakash M, Lakshmi K, Anuradha S, et al. Bacteriological profile and their antibiotic susceptibility pattern of cases of chronic suppurative otitis media. Asian Journal Pharmaceutical and Clinical Research 2013;6:210-212.
3. Yousuf A, Malik M, Shamas IU, et al. Bacteriological profile of ear discharge and their antibiotic sensitivity in chronic suppurative otitis media in Kashmir, India. Bangladesh Journal of Medical Sciences 2012;11(03):212-216.
4. Arvind N, Chand Pavan, Vishrutha KV. Microbiological profile of chronic suppurative otitis media. International Journal of Biomedical Research 2014;05(03).
5. Shrestha BL, Amatya RCM, Shrestha I, et al. Microbiological profile of chronic suppurative otitis media. Nepalese Journal of ENT, Head and Neck Surgery 2011;2(2):6-7.
6. Arti Agrawal, Dharmendra Kumar, Ankur Goyal, et al. Microbiological profile and their antimicrobial sensitivity pattern in patients of otitis media with ear discharge. Indian Journal of Otology 2013 January;19:5-8.

7. Kuchhal V. Antibiotic sensitivity pattern in chronic suppurative otitis media in Kumaon region. Indian J Otol 2010;16:17-21.
8. Chakraborty A, Bhattacharjee A, Purkaystha P. Microbiological profile of chronic suppurative otitis media: its significance in North-East India. Indian J Otol 2005; 11:39-44.