Original Article

Bacteriological Profile of Chronic Suppurative Otitis Media in Patients at a Tertiary Level Hospital

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ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is a disease of multiple etiologies and is well known for its persistence and recurrence in spite of antimicrobial treatment often leading to complications. Hence, knowledge of the current bacterial pathogens along with susceptibility pattern is important in management of cases with CSOM. **Objectives:** The aim of present study was to observe the bacteriological profile of CSOM and their antimicrobial susceptibility pattern. **Methods:** The 142 samples of ear discharge from 100 patients of CSOM, reported to the out-patient department of Otolaryngology, S.S. Hospital, Banaras Hindu University, Varanasi between July 2012 and June 2013 were collected processed for Gram stain and culture isolation. **Results:** On culture isolation, *Staphylococcus aureus* was the commonest pathogen, followed by Pseudomonas spp., *Proteus* spp., *and Escherichia coli*. *Staphylococcus aureus* showed maximum susceptibility towards Clindamycin whereas leading gram negative isolate *Pseudomonas aeruginosa* showed maximum susceptibility towards levofloxacin. **Conclusion:** The study proved to be useful for clinicians in management of CSOM. Further, there is a definite need to ponder over those 14% cases which were negative on aerobic culture.

Keywords: Chronic suppurative otitis media (CSOM), MRSA, *Pseudomonas aeruginosa*, S*taphylococcus aureus*

Chronic suppurative otitis media (CSOM) is a disease of multiple etiologies and is well known for its persistence and recurrence in spite of treatment [1]. It is a disease of mucoperiosteal lining of the middle ear cleft [1]. It may be acute, subacute and chronic suppurative otitis media. It is important to know what type of bacteria takes part in the event of suppuration, so that appropriate antibiotics may be given for treatment and to prevent complications. Generally, the patients with tympanic membrane perforation which continue to discharge mucoid secretions from the period of 6 weeks to 3 months despite medical treatment are recognised as CSOM [2]. The assessment and management of CSOM, presents many challenging and fascinating problems.

The indiscriminate, haphazard and half- hearted use of antibiotics and poor follow up of the patients have resulted in persistent low grade infectional changes in the microbiology of the disease; the advent of new antimicrobials, anti-inflammatory and anti-histamine agents make an important evaluation of bacterial flora of CSOM [3]. Knowledge of local micro-organism pattern and their antibiotic sensitivity is essential for effective and low cost treatment of this disease. Changes in the microbiological flora following the advent of sophisticated synthetic antibiotics increases the relevance of reappraisal of the modern day flora in CSOM and antibiotic sensitivity pattern is very important for clinician to plan a general outline of treatment [4].

This study was primarily planned to isolate the bacterial flora in the middle ear of patients suffering from CSOM and also to study the antibiotic sensitivity pattern of these organism to commonly used antimicrobial agents.

MATERIALS AND METHODS

The present study was conducted between July 2012 and June 2013. A total of 142 ear swabs from 100 cases with CSOM attending outpatient of Department of Otorhinolaryngology of the institute were selected for present study. Prior approval from the institutional ethical committee was obtained. Written consent was obtained from the patients before taking ear swabs.

Outer contaminated discharge was cleaned with sterile cotton. With the help of sterile cotton swab, discharge from deep area near from tympanic membrane was taken under full aseptic precautions. The samples were immediately transported to Department of Microbiology for further processing. The specimens were inoculated on 5% sheep Blood agar and MacConkey agar. After overnight incubation at 37°C, growth of microorganisms were examined, then after proper biochemical tests, species level identification was done and antimicrobial susceptibility testing for isolated bacteria was performed using modified Kirby Bauer method [5].

Table 1: Spectrum of bacterial flora isolated from CSOM cases (n=142)

Organism	Sample yield	
	Number	Percentage
Escherichia coli	8	6
Citrobacter spp	2	1.5
Klebseilla pneumonia	8	6
Staphylococcus aureus	54	38
Acinetobacter spp.	2	1.5
Proteus spp.	10	7
Pseudomonas aeruginosa	38	26
Sterile for aerobic isolates	20	14
Total	**142**	**100**

The antibiotics used were erythromycin (15 µg), trimethoprim+sulphamethoxazole (25 µg) , clindamycin (2 µg), netilmicin(30 µg), vancomycin (30 µg), linezolid (30 µg), carbenicillin (100 µg), ceftazidime (30 µg), gentamicin (10 µg), amikacin (30 µg), ciprofloxacin (1 µg), ofloxacin (5 µg), levofloxacin (5 µg), imipenem(10 µg), piperacilin+tazobactum (110 µg), polymyxin B (300 µg), cefepime, meropenem(10 µg), ampicillin(10 µg),, amoxicillin+clavulanic acid (25 mcg), cefazolin (30 µg), cefalexin(30 µg), cefuroxime(30 µg), cefotaxime (30 µg), ceftriaxone(30 µg) and ertapenem(10 mcg). Cefoxitin disc (30 µg) diffusion test was performed for MRSA detection.

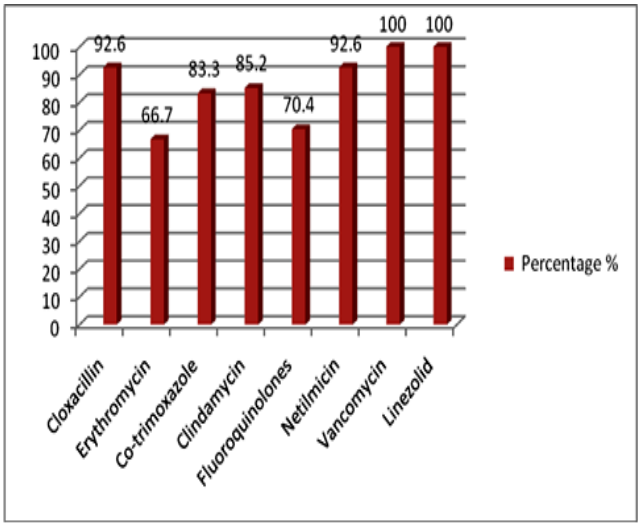

Figure 1 - Antibiotics sensitivity of *Staphylococcus aureus*

RESULTS

Out of 142 samples, on culture isolation 122 (86%) yielded bacterial isolates. *Staphylococcus aureus* (38%) was the commonest pathogen, followed by *Pseudomonas* spp., *Proteus* spp., *Escherichia coli*, *Klebsiella pneumoniae*, *Citrobacter spp*, *and Acinetobacter spp.* (**Table 1**). Of the 54 isolates of *S. aureus*, 7% isolates were observed to be methicillin resistant *staphylococcus aureus* (MRSA).

On observing the antibiotic sensitivity pattern of *Staphylococcus aureus* we found that, among the first line antibiotics applied, clindamycin was found to be most useful as 46 isolates (85%) were observed to be susceptible to this antibiotic (**Fig 1**) and for *Pseudomonas aeruginosa*, the first line antibiotics carbenicillin and fluoroquinolones were equally found to be useful as 29 isolates (76%) were susceptible to these antibiotics (**Fig 2**).

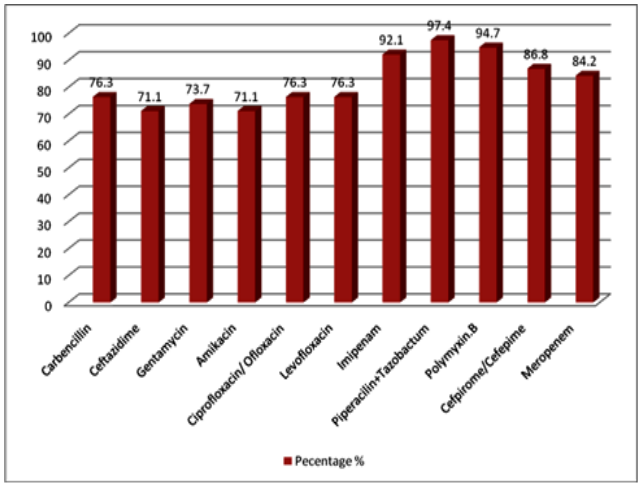

Figure 2 - Antibiotics sensitivity of *Pseudomonas aeruginosa*

DISCUSSION

Out of 142 samples subjected for culture isolation, only aerobic organisms were isolated. Overall, gram negative (47.9%) bacteria were more common than the gram positive ones (38%) as found in our study. *Staphylococcus aureus* (38%) was the most common organism followed by *Pseudomonas aeruginosa* (26%). In this study, only 7% strains of *S. aureus* were observed to be MRSA, based on cefoxitin disc diffusion testing. In contrast, one study from South India showed 18% of CSOM associated *S. aureus* strains to be MRSA [6]. In another report from North India, *S. aureus* was the second commonest pathogen in CSOM following *P. aeruginosa* [4].

The occurrence of MRSA was comparable to prevalence of MRSA in community and much lower than hospital acquired *Staphylococcus aureus*. Among the first line antibiotics, gram positive bacteria were observed to be highly susceptible to clindamycin, whereas gram negative organisms showed high sensitivity to levofloxacin. A study from Egypt found similar high susceptibility patetrn of *P. aeruginosa* isolates in CSOM to Ciprofloxacin [7].

As the strains of bacterial isolates responsible for CSOM are still found to be responsive to first line drugs, at least in our area, the treatment of CSOM should be tailored according to the pattern in the microbiological flora of each discharging ear. As far as we know, this is the first study from this region regarding the common bacterial pathogens isolated in cases of CSOM and their antibiogram in this region. More such studies are urgently required in this context, as they will help the clinician in selecting the optimum pre-emptive therapy in these cases.

CONCLUSION

Present study provided the current data of bacteriological profile in cases of CSOM and their antibiotics susceptibility which proved useful in management of these cases. Further, there is a definite need to ponder over those 14% cases which were negative on aerobic culture.

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