ISSN: 2279 - 0594

Available Online at www.jbpr.in

Journal of Biomedical and Pharmaceutical Research 3 (2) 2014, 05-08

RESEARCH ARTICLE

BACTERIOLOGICAL PROFILE OF CHRONIC SUPPURATIVE OTITIS MEDIA IN A TERTIARY CARE CENTRE IN SOUTH INDIA

[*1]Sudhindra.K.S, [2]V.N.Venkatesh, [3]Nirmala Grace. B, [4]Ravish Kumar.M, [5]Shwetha.D.C

[1]Associate Professor, Department of Microbiology, Basaveshwara Medical College & Hospital, Chitradurga. Karnataka, India

[2]Professor and Head, Department of Microbiology, Basaveshwara Medical College, Chitradurga, India

[3]Assistant Professor, Department of Microbiology, Guntur Medical College Guntur, India

[4]Assistant Professor in Microbiology, Basaveshwara Medical College & Hospital, Chitradurga, India

[5]Assistant Professor in Microbiology, Basaveshwara Medical College & Hospital, Chitradurga, India

Received 11 February 2014; Accepted 21 February 2014

ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is a disease of multiple aetiologies and is well known for its persistence despite treatment and may result in permanently disabling and potentially fatal complications. The frequent presence of CSOM in general practice and poor response to the routine treatment made us undertake this study. **Aim:** To identify the bacteria causing CSOM and their antibiotic susceptibility pattern. **Methods:** A cross sectional study involving 200 patients with chronic ear discharge was undertaken. Ear swabs were taken and cultured for bacteria. Biochemical tests were done for identification of the isolate and antibiotic susceptibility testing was done by Kirby-Bauer's disc diffusion method. **Results**: Pseudomonas aeruginosa (36%) was the most common isolate followed by Staphylococcus aureus (21%). Meropenem, Piperacillin/Tazobactum and Ceftriaxone/Sulbactum were most effective drugs for P.aeruginosa whereas Vancomycin and Linezolid were most efficient for S.aureus **Conclusions:** Periodical evaluation of bacteriological profile and their susceptibility pattern helps in choosing presumptive drugs for successful treatment and minimizing complications of CSOM and emergence of resistant strains.

Key words: Bacteria, Chronic Suppurative Otitis Media, Pseudomonas aeruginosa, Staphylococcus aureus, Susceptibility.

INTRODUCTION:

The battle against micro-organisms in the primary role of infectious diseases and their complications has not decreased despite modern anti-microbial therapy. Chronic Suppurative Otitis Media (CSOM) has received considerable attention, not only because of its high incidence, but also because of issues such as antibiotic resistance and ototoxicity with both topical and systemic antibiotics. Changes in the bacteriological flora following the advent of sophisticated antibiotics and anti-histaminics increases the relevance of study of modern day flora in CSOM[(1)].

The aim of our study was to determine the bacteriological agents causing CSOM and to study their antibiotic susceptibility pattern to help the clinicians choose the appropriate antibiotic for treatment.

Material and methods:

Two hundred patients who presented to the ENT outpatient department from Jan 2010 to Jun 2011 with history of chronic ear discharge were studied.

All the necessary clinical details were obtained in a pre-designed pre tested proforma.

Selection of cases:

Cases were selected based on certain inclusion and exclusion criteria.

Inclusion criteria:

1. All the patients who had active ear discharge for more than three months.

Exclusion criteria:

1. All patients already diagnosed to have otomycosis or malignancy in the ear.
2. All patients who had taken any treatment either systemic or topical in the form of ear drops.

Clinical specimens:

*Corresponding author: Dr. Sudhindra.K.S | Email: dr_sudhindraks@yahoo.co.in

Two swabs were collected from each patient using single use commercially available sterile cotton swabs. The ear discharge was collected with the aid of aural speculum and care was taken to avoid surface contamination.

Processing of samples:

The first swab was used for Gram's staining and the second one for aerobic bacteriological culture. Culture was done on Blood agar, Macconkey's agar and Chocolate agar. The plates were incubated at 37^0C for 24-48 hrs. The isolates were identified by colony morphology and standard biochemical tests. Antibiotic susceptibility testing was done on Mueller-Hinton agar using Kirby-Bauer's disc diffusion te
chnique. The plates were read out after incubation for 18-24 hrs by measuring the zone of inhibition around the antibiotic discs as per the Clinical Laboratory Research Institute (CLSI) guidelines[2].

Ethical considerations:

The protocol for this study was approved by the Institutional Ethical Committee (IEC). The approval was on the agreement that patient anonymity must be maintained, good laboratory practice, quality control ensured, and that every finding would be treated with utmost confidentiality and for the purpose of this research only. All work was performed according to the International guidelines for Human Experimentation in Biomedical Research[3]. Approval was obtained from the subjects by taking the informed consent.

RESULTS:

A total of 200 patients were included in the study. The age of these patients ranged from 05 to 76 years and comprised of 116 male and 84 female patients.

Out of 200 samples, 170 samples (85%) were culture positive for bacteria. Single organism was isolated in 164 samples (82%) while 06 samples (03%) yielded growth of two organisms.

Out of the remaining 30 samples, 24 samples (12%) yielded no growth whereas 05(2.5%) samples yielded fungal growth i.e Candida species and 01(0.5%) yielded contaminants.

Table 1: Different organisms isolated from CSOM patients

Organisms isolated	Isolates	n (%)
Gram negative organisms	Pseudomonas aeruginosa	72(36)
	Klebsiella species	14(07)
	Escherichia coli	12(06)
	Non Fermenting Gram Negative Bacilli	08(04)
Gram positive organisms	Staphylococcus aureus	42(21)
	Coagulase negative Staphylococcus	16(08)
	Streptococcus pneumoniae	12(06)

The most common isolate was P.aeruginosa 72(36%) followed by S.aureus 42(21%) followed by others as shown in Table 1

Table 2: Antibiotic susceptibility pattern of Gram Positive isolates

	P	Amp	Cip	Gen	E	Cep	Ox	Amc	Va	Lz
S.aureus	16 (38%)	16 (38%)	28 (66.6%)	36 (85.7%)	30 (71.4%)	36 (85.7%)	38 (90.4%)	38 (90.4%)	42 (100%)	42 (100%)
CoNS	12 (75%)	12 (75%)	15 (97.5%)	16 (100%)	16 (100%)	16 (100%)	16 (100%)	16 (100%)	16 (100%)	16 (100%)
S.pneumoniae	12 (100%)	12 (100%)	12 (100%)	12 (100%)	12 (100%)	12 (100%)	12 (100%)	12 (100%)	12 (100%)	12 (100%)

S.aureus was 100% sensitive to Linezolid and Vancomycin. Four out of 42 (9.6%) strains of S.aureus were Methicillin resistant. Other Gram positive organisms were sensitive to routinely used antibiotics. The overall antibiotic susceptibility pattern of Gram positive organisms is shown in Table 2.

Table 3: Antibiotic susceptibility pattern of Gram negative isolates

	Amp	Cot	Cip	Gen	Ak	Ctr	Cpd	CiS	Cpz	Pit	Mrp	At
Pseudomonas aeruginosa	34 (47.2%)	40 (55.5%)	56 (77.7%)	62 (86.1%)	64 (88.8%)	55 (76.3%)	59 (81.9%)	69 (95.8%)	56 (77.7%)	70 (97.2%)	70 (97.2%)	56 (77.7%)
Klebsiella species	00 (0%)	06 (42.8%)	10 (71.4%)	12 (85.7%)	12 (85.7%)	10 (71.4%)	10 (71.4%)	13 (92.8%)	10 (71.4%)	14 (100%)	14 (100%)	14 (100%)
Escherichia coli	02 (16.6%)	04 (33.3%)	07 (58.3%)	10 (83.3%)	09 (75%)	09 (75%)	09 (75%)	12 (100%)	08 (66.7%)	12 (100%)	12 (100%)	12 (100%)
NFGNB species	00 (0%)	00 (0%)	04 (50%)	06 (75%)	06 (75%)	06 (75%)	06 (75%)	08 (100%)	08 (100%)	08 (100%)	08 (100%)	08 (100%)

P.aeruginosa was susceptible to Meropenem and Piperacillin/Tazobactum in 97.2% of isolates followed by Ceftriaxone/Sulbactum in 95.8% of isolates and others. Other Gram negative isolates were sensitive to the routinely used antibiotics. The overall antibiotic susceptibility pattern of Gram negative organisms is shown in Table 3.

DISCUSSION:

Twenty four out 200 samples (12%) in our study yielded no growth which might be because of prior antibiotic usage. Our study is in comparision with Chakraborthy et.al[4] (12.6%), Fatma et.al[5] (16.9%) and Vijaya et.al[6] (16.9%). However Kumar et.al[7] (4.39%) and Sateesh et.al[8] (3.08%) have reported much lesser rates of sterile cultures.

Our study shows P.aeruginosa (36%) as the most common isolate in CSOM followed by S.aureus (21%). The third most common isolate, Coagulase Negative Staphylococcus (08%) may actually be a skin commensal and not a true pathogen. These findings are in comparision with previous authors[5,6,7,8] and Raghavendra et.al[9]. Arti et.al[10] found S.aureus as the most common isolate which is second most common in our study whereas Gulati et.al[11] in 1969 and Ayyagari et.al[12] 1981 found Klebsiella species as the most common isolate which is fourth most common in our study. This shows that the most common bacterial agent causing CSOM keeps changing from time to time.

Antibiotic susceptibility pattern of P.aeruginosa in our study revealed 95-97% susceptibility to Meropenem, Piperacillin/Tazobactum, Ceftriaxone/Sulbactum, 76-88% susceptibility to Ceftriaxone, Aztreonam, Ciprofloxacin, Cefaperazone, Cefpodoxime, Gentamycin, Amikacin and 47-55% susceptibility to Ampicillin and Co-trimoxazole.

Antibiotic susceptibility pattern of S.aureus shows 100% susceptibility to Vancomycin and Linezolid. Four out of 42(9.6%) strains of S.aureus turned out to be Methicillin resistant. 66-85% of S.aureus strains showed showed susceptibility to Ciprofloxacin, Erythromycin, Gentamycin, and Cephalexin while only 38% showed susceptibility to Penicillin and Ampicillin. Our findings are in comparision with many previous authors[5,6,7,8,9].

Other Gram negative isolates i.e Klebsiella species, Escherichia coli and other Non-Fermenting Gram negative bacilli showed 100% susceptibility to Meropenem, Aztreonam, Piperacillin/Tazobactum and Ceftriaxone/Sulbactum drugs along with varying susceptibility patterns to other routine antibiotics.

The other Gram positive isolates i.e Coagulase negative Staphylococcus and S.pneumoniae were 75-100% susceptible for all the antibiotics tested.

Limitations of the study:

Non-fermenting Gram negative bacilli means it excludes Pseudomonas aeruginosa and other Non-fermenting Gram negative bacilli and Coagulase negative Staphylococcus were not processed up to species due to time consuming tests involved and also for financial constraints.

CONCLUSIONS:

In the era of antibiotics, the emergence of antibiotic resistance is common. Irrational use of antibiotics is an important factor for development of

antibiotic resistance. Such practice should be strongly condemned. Therefore periodical evaluation of bacteriological isolates and their antibiotic susceptibility patterns in local area will be of great help in administering appropriate antibiotics for empirical treatment and also reducing the potentially disabling and fatal complications of CSOM and also decreases the chances of emergence of resistant strains of bacteria.

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