

## Bacterial and Fungal Study of 100 Cases of Chronic Suppurative Otitis Media.



### Microbiology

**KEYWORDS:** CSOM, Bacterial isolates, Fungal isolates, Antibiotic susceptibility.

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### ABSTRACT

**Objective** – To study the bacterial and fungal organisms present in chronic suppurative otitis media and to study the antibiotic sensitivity pattern of the bacterial isolates. **Methodology** – A total number of 100 patients with clinical diagnosis of CSOM, attending the ENT OP comprised the study group. Three pus swabs from each patient discharging ear were collected. One pus swab is used for smear preparation, second swab for bacterial cultures and third swab for fungal cultures. Bacterial isolates identified and antibiotic susceptibility testing is done. Fungal isolates were identified by conventional methods. The findings were analysed. **Results** – Out of 100 patients, 53% were females and 47% were males. In this 40% belonged to 0-15 yrs age group. From 100 bacterial cultures 95 bacterial strains were isolated. In this *Pseudomonas aeruginosa* (36), *Klebsiella*(20), *Staphylococcus aureus*(10) followed by other organisms. Different fungal organisms isolated from 100 cultures were *Candida albicans*(12), *Aspergillus flavus*(5), *Aspergillus niger*(4). Study of antibiotic susceptibility of 95 bacterial isolates revealed that Imipenem is most effective without resistance followed by Amikacin(6.3% resistance), Gentamicin(7.3%), Ciprofloxacin(10.5%) followed by other antibiotics. **Conclusion** – The present study stresses the need for careful isolation of both bacterial and fungal organisms to establish the role of fungi in CSOM pathology and to prevent administration of unwanted antibiotics.

### INTRODUCTION

CSOM with its complications is one of the common diseases in the practice of otologist, paediatrician and general practitioner. CSOM is an infection of the middle ear and mastoid cavity<sup>1</sup>. It is defined as persistent or intermittent infected discharge of more than 3 months duration through perforated or non intact tympanic membrane caused by bacteria, fungi and viruses resulting in inflammation of the mucosal lining that often results in partial or total loss of tympanic membrane and the ossicles<sup>5</sup>. CSOM is one of the most common causes of deafness and can cause permanent perforation of tympanic membrane. World Health Organization had estimated that CSOM prevalence in India, Tanzania, Solomon islands, Guam, Australian aborigines and Greenland is highest (> 4%) and urgent attention is needed to deal with the health problem<sup>1</sup>. In the recent years a steady increase in the incidence of gram negative bacterial infections has been observed. Many a times random antibiotic therapy prior to a defined laboratory diagnosis, leads to indiscriminate use of antibiotics, which results in emergence of resistant strains. Recent advances in the management of CSOM emphasize the necessity of bacteriological examination of ear discharge and mycological study.

In the present study an earnest attempt was made to study the bacterial and fungal flora of CSOM cases.

### METHODOLOGY

A total number of 100 patients with clinical diagnosis of CSOM attending ENT OP department of Govt. General Hospital, Kakinada during February 2012 to September 2014, comprised the study group. All these are not having recent treatment with antibiotics either locally or systemically. These cases included are individuals of both sexes and all age groups.

Clinical evaluation of the disease was done by presence of perforation of tympanic membrane and otorrhoea which are the two presenting symptoms of patients. The discharging pus was collected under aseptic conditions with the help of sterile swabs in triplicate by dipping into deep meatus through it drains. The pus samples from each patient was analyzed in the department of Microbiology.

The material of the first swab was used for making smears and for KOH preparation for microscopic examination. The second

swab was used to inoculate on two Sabourad's Dextrose agar slopes and incubated at 37°C and another at 25°C. The third swab was used for bacteriological cultures on Blood agar and MacConkey agar. The bacterial strains isolated were identified according to standard procedures given in Mackie MacCartney 14<sup>th</sup> edition<sup>2</sup>. Bacterial isolates were subjected to antibiotic susceptibility test using disc diffusion method by Kirby-Bauer. Fungal growth on SDA were identified by standard identification methods<sup>3</sup>.

### RESULTS

Out of 100 CSOM patients investigated in the present study includes various age groups ranging from 3-70 years. In these 100 cases 47 were males and 53 were females. In this 40 cases belonged to 0-15 years age group.

On culture of 100 patients swabs 95 bacterial strains and 21 fungal strains were isolated. 68 patients swabs showed growth of one bacterial organism, 4 patients swabs shows mixture of two bacterial strains, 19 patients swabs showed one bacterial and one fungal strain, 2 patients swabs shown only fungal growth and 7 patients swabs showed no growth of any organism.

Out of 95 bacterial organisms isolated from cultures,

*Pseudomonas aeruginosa* 36 ( 37.89% ), *Klebsiella pneumoniae* 20 ( 21.05% ), *Staphylococcus aureus* 10 ( 10.52% ), Coagulase negative *Staphylococci* 9 ( 9.47% ), *Escherichia coli* 7 ( 7.35% ), *Proteus* 6 (6.31% ), *Acinetobacter* 3 ( 3.15%), *Providencia* 2 ( 2.1%) and *Morganella morganii* 2 ( 2.1%).

Out of 21 fungal organisms isolated from cultures, *Candida albicans* 12(57.14%), *Aspergillus flavus* 5 (23.80%), *Aspergillus niger* 4 ( 19.04%) were found.

Overall antibiotic sensitivity patterns of aerobic bacterial organisms from CSOM cases revealed that Imipenem(imp) was most effective antibiotic followed by Amikacin(AK), Gentamicin (Gen), Ciprofloxacin(cip), Amoxycillin plus clavulanic acid(Amc), Cefatoxime(ctx) and Cotrimaxazole(Cot).

**TABLE – SHOWING THE BACTERIAL ISOLATES FROM CSOM CASES AND THEIR RESISTANCE PATTERN TO ANTI-BIOTICS**

ORGANISM	TOTAL	Imp	Ak	Gen	Cip	Amc	Ctx	Cot
1.Pseudomonas aeruginosa	36	0	5 14%	0	0	17 47%	17 47%	0
2.Klebsiella pneumoniae	20	0	0	1 5%	1 5%	0	6 30%	0
3.Staphylococcus aureus	10	0	0	0	5 50%	0	0	3 30%
4.CONF	09	0	0	0	2 20%	0	0	6 67%
5.E.coli	07	0	0	3 43%	2 28%	2 28%	0	5 71%
6.Proteus species	06	0	0	3 50%	0	1 17%	1 17%	2 33%
7.Acinetobacter	03	0	0	0	0	1 33%	1 33%	1 33%
8.Providencia species	02	0	1 50%	0	0	0	1 50%	0
9.Morganella morganii	02	0	0	0	0	0	0	0
Total	95	0	6	7	10	21	26	27
% of organisms resistant to each antibiotic		0	6.3%	7.3%	10.5%	22%	27%	28%

## DISCUSSION

CSOM is a well-known destructive and persistent disease, with insidious onset and capable of causing irreversible sequelae. The reason of serious concern particularly in children is, it may have long term effects on hearing. Early microbiological diagnosis ensures prompt and effective treatment to avoid such conditions<sup>4</sup>. Drug sensitivity tests of bacterial isolates recovered is essential for making appropriate decision of antimicrobials that will effectively eradicate the pathogen.

Among 100 cases studied, in the present study females are 53% and males are 47%. Correlates with the observation reported by Shrestha.B.L.etal 2011<sup>5</sup>,Harvinder kumar and Sonia seth<sup>6</sup>.Among the study group the highest incidence of cases observed in the 0-15 age group correlating with <sup>5,6</sup>.

Different bacterial species isolated from cultures in the study showed Pseudomonas aeruginosa 36 (37.89%) is the most predominant organism followed by Klebsiella pneumoniae 20 (21.05%) followed by Staphylococcus aureus10 (10.52%) is in correlation with V.K.Poorey etal (2000)<sup>7</sup>,Mohammed.S etal<sup>8</sup>,AHC Loy etal<sup>9</sup>,Kamran Iqbal etal(2011)<sup>10</sup> .The incidence of Proteus group in this study is 10%, correlating with the reports of V.K.Poorey(2000)<sup>7</sup>(9.8%), Karman Iqbal (2011)<sup>10</sup>(8%)

According to Mawson 1963<sup>12</sup> Proteus species and Pseudomonas species do not normally inhabit the upper respiratory tract and these organisms are considered mostly as secondary invaders from the external auditory canal gaining access to the middle ear via defect in the tympanic membrane resulting from an acute episode of otitis media. The infectivity of these organisms is not high comparatively and their foot hold is gained only when resistance of middle ear has been significantly lowered by on slaughter with other organisms<sup>11</sup>.

Our observation of Candida albicans as predominant isolate followed by Aspergillus species is in correlation with Harvinder Kumar etal<sup>6</sup> and Kamran Iqbal etal<sup>10</sup>

The overall antibiotic sensitivity pattern of organisms isolated in the present study is correlating with the sensitivity pattern tested in the study of Kamran Iqbal etal<sup>10</sup>

The high susceptibility of all the strains in general and Gram negative organisms in particular to Imipenem and Amikacin can be attributed to the sparing use of these drugs in the treatment of CSOM cases.

## CONCLUSION

In the present scenario recovery of both bacterial and fungal species from CSOM cases necessitates the formulation of antimicrobial policy against all potential pathogens taking into consideration the role played by fungal species in the chronicity of CSOM.

## ACKNOWLEDGEMENTS

The authors are thankful to the surgeons in the ENT Department of Government General Hospital, Kakinada for their cooperation while collecting ear swabs from CSOM patients.

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