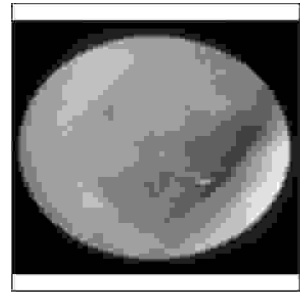


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## CHRONIC SUPPURATIVE OTITIS MEDIA; FREQUENCY OF PSEUDOMONAS AERUGINOSA IN PATIENTS AND ITS SENSITIVITY TO VARIOUS ANTIBIOTICS.



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**ABSTRACT...** [drejzrahim@yahoo.com](mailto:drejzrahim@yahoo.com) **Objectives:** To identify the frequency of pseudomonas aeruginosa in patients of chronic suppurative otitis media and its sensitivity to various antibiotics. **Design:** A descriptive study. **Place & Duration of Study:** The study was carried out from Nov 2002 to May 2003 at Department of ENT, Head and Neck surgery, Combined Military Hospital, Rawalpindi. **Material & Methods:** A total 150 patients with unilateral or bilateral active Chronic Suppurative Otitis Media from the out patients clinic were included in the study. All patients were evaluated through detailed history and through clinical examination. Pus samples were collected from the discharging ear(s) and sent to pathological laboratory of the hospital for culture sensitivity. **Results:** In this study, 82% cases yielded pure cultures, 15% yielded mixed cultures while 3% yielded no growth. The pure cultures yielded pseudomonas aeruginosa in 52.5% of the cases, Staph. Aureus in 15%, Proteus SPP in 6.5%, klebsiella in 2.6%, E. Coli in 2%, anaerobes in 1.3%, Aspergillus in 1.3% and Candida in 0.6% of the cases. In mixed cultures, pseudomonas was isolated in 7.3% of the cases, Staph. Aureus in 2.6%, proteus in 2%, Klebsiella in 0.6% and E. Coli in 0.6% of the cases. Pseudomonas was sensitive to Gentamicin in 70% of cases, Amikacin 92%, Ciprofloxacin 95%, Ceftazidime 84%, Cephoperazone 82%, Cefipime 84%, Aztreonam 83%, imipenem 98%, Levofloxacin 97%, Augmentin 67% and chloramphenicol in 56% of the cases. **Conclusion:** Pseudomonas aeruginosa was the most commonly isolated organism followed by staphylococcus aureus. Pseudomonas aeruginosa is increasingly becoming more resistant to the common drugs. This necessitates the early diagnosis and prompt treatment of the disease so as to avoid the complications of CSOM.

**Key words:** Chronic Suppurative Otitis Media, Pseudomonas Aeruginosa, Microbiology, Sensitivity.

## INTRODUCTION

Chronic ear diseases have plagued humanity even before the modern history started. These diseases even today, lead to a wide variety of complications. Otolologists for many years have tried to establish a common terminology to describe the clinical and pathological features of chronic suppurative otitis media. The most acceptable definition is that chronic suppurative otitis media (CSOM) is an infection of the middle ear that lasts more than 3 months and is accompanied by tympanic membrane perforation<sup>1</sup>. The disease is more prevalent in lower socioeconomic groups. Suppurative otitis media is a very frequent diagnosis in infants and children attending a physician because of illness<sup>2</sup>. Of the 120 million prescriptions written for oral antibiotics each year in USA, more than 25% are for the treatment of otitis media. Although the development of CSOM may follow an acute infection, the type of organisms found in chronic discharge differs from those in acute infections. Many studies have been done to investigate the microbial flora in CSOM. The commonest organisms isolated are *Pseudomonas aeruginosa*, *Proteus* species and *Staphylococcus aureus*. Other organisms found less commonly were *E. coli*, *Diphtheroid*, *Klebsiella* species and anaerobic bacteroids<sup>3</sup>. The most common organism isolated in various studies is *Pseudomonas aeruginosa*<sup>4</sup>.

The present study is a descriptive study and was performed in CMH, Rawalpindi to find the frequency of *Pseudomonas aeruginosa* in adult patients of CSOM and also to find the most effective antibiotic against it for empirical use in ENT OPD.

## SPECIMEN COLLECTION PROCEDURE

Pus swabs were taken from the affected ear on a sterile swab in the ENT OPD and were sent to the AFIP Rawalpindi. Commercially available pre-packed sterile cotton swabs were used. Samples of discharge were obtained after cleaning the external auditory canal by suction. Swabs were taken from the deeper parts of external auditory canal. The swabs were inoculated on MacConkey, blood and chocolate agar and were inoculated at 37° C for 24-48 hours. The chocolate agar was kept in candle jar. The isolates were identified using

gram staining, oxidase and biochemical strips using QTS-24 identification strips.

The anti-microbial susceptibility was performed on Mueller Hinton agar using the technique NCCLS. Interpretation of sensitivity of various antibiotics was made according to the recommendations of NCCLS.

## PATIENTS AND METHODS

This is a hospital based descriptive study conducted at ENT Department, Combined Military Hospital, Rawalpindi, which is a tertiary care hospital. All required information about the patients, which includes name, age, sex, address, occupation, socioeconomic status, presenting complaints, present and past history, physical examination, culture and sensitivity tests, pure tone audiometry and other laboratory investigations, complications. Conservative and operative treatment and followup were recorded on a predetermined printed data form specially designed for this purpose.

One hundred and fifty (150) adult patients diagnosed as chronic suppurative otitis media from Nov 2002 to May 2003 were included in the study. Age groups above 12 years and patients of both sexes were included. Most of the patients had been receiving or had received systemic/topical anti-microbial drugs were stopped for 72 hours prior to taking specimens for culture and sensitivity test. *Pseudomonas aeruginosa* ATCC 27853 was used as control organism. SPSS Ver. 10 was used for analysis.

## RESULTS

One hundred and fifty (150) patients which, 94(64%) were male patients while 66(36%) were female, 79% of the patients belonged to the lower socioeconomic group, 18% to middle and 3% to upper socioeconomic group. The discharge was recurrent and odorless in 40% of the cases, recurrent and foul smelling in 21% continuous and foul smelling in 22%, continuous and odorless in 15% and blood stained in 3% of the cases. Perforation was central in 69% of the cases, postero-superior marginal in 20% and attic in 11% of the cases. The degree of hearing loss was mild (up to 26 dB) in 18% of the cases,

moderate loss in 68% (27 to 60 dB) and severe loss (> 60dB) was seen in 14% of the patients.

### ORGANISM CULTURED

in our study, 82% cases yield pure cultures, 15% yielded mixed cultures while 3% yielded no growth (Table I).

| Organisms     | Total cases | % Age |
|---------------|-------------|-------|
| Pure culture  | 124         | 82%   |
| Mixed culture | 20          | 15%   |
| No growth     | 06          | 03%   |
| Total         | 150         | 100%  |

The pure cultures yielded pseudomonas aeruginosa in 52.2% of the cases, Staph aureus in 15%, proteus spp in 6.5%, klebsiella in 2.6%, E. Coli in 2%, Anaerobes in 1.3%, aspergillus in 1.3% and Candida in 0.6% of the cases (Table II).

| Organisms              | Total Cases | % Age |
|------------------------|-------------|-------|
| Pseudomonas Aeruginosa | 79          | 52.2% |
| Staph Aureus           | 23          | 15.0% |
| Proteus spp            | 10          | 6.5%  |
| Klebsiella             | 04          | 2.6%  |
| E.Coli                 | 03          | 2.0%  |
| Anaerobes              | 02          | 1.3%  |
| Aspergillus            | 02          | 1.3%  |
| Candida                | 01          | 0.6%  |
| Total                  | 124         | 82%   |

In mixed cultures, pseudomonas was isolated in 7.3% of the cases, Staph. Aureus in 2.6%, proteus in 2%, klebsiella in 0.6% and E. Coli in 0.6% of the cases (Table

III).

| Organisms              | Total Cases | % Age |
|------------------------|-------------|-------|
| Pseudomonas Aeruginosa | 11          | 7.3%  |
| Staph Aureus           | 04          | 2.6%  |
| Proteus spp            | 03          | 2.0%  |
| Klebsiella             | 01          | 0.6%  |
| E.Coli                 | 01          | 0.6%  |
| Total                  | 20          | 13%   |

### SENSITIVITY PATTERN

Pseudomonas was sensitive to Gentamicin in 70% of cases, Amikacin 92%, Ciprofloxacin 95%, Ceftazidime 84%, Cefoperazone 82%, Cefipime 84%, Aztreonam 83%, Imipenem 98%, Levofloxacin 97%, Augmentin 67% and Chloramphenicol in 56% of the cases (Table IV).

| Drugs           | Short Name | Sensitivity % |
|-----------------|------------|---------------|
| Imipenem        | IMP        | 98.0%         |
| Levofloxacin    | LEVO       | 97.0%         |
| Ciprofloxacin   | CIP        | 95.0%         |
| Amikacin        | AMK        | 92.3%         |
| Aztreonam       | AZT        | 92.0%         |
| Cefipime        | CEPM       | 84.6%         |
| Ceftazidime     | CAZ        | 84.1%         |
| Cefoperazone    | CFP        | 82.3%         |
| Gentamicin      | GENT       | 70.0%         |
| Augmentin       | AUG        | 67.0%         |
| Chloramphenicol | CHLOR      | 56.0%         |

### DISCUSSION

Chronic suppurative otitis media (CSOM) is an ENT

entity that is often difficult to treat, especially in the lower socioeconomic group where it is prevalent. The difficulty to treat comes from the fact that most of the times the treatment is inadequate and there is failure of compliance. This lead to the emergence of resistant organisms and to invasion by secondary pathogens<sup>14,15</sup>. Our study has shown that *Pseudomonas aeruginosa* is the major pathogen involved in the etiology of CSOM. The sensitivity pattern of *Pseudomonas* shows that it is increasingly becoming more resistant to the common and routine antibiotics used in the ENT OPD. One reason for this could be the fact that most of these patients usually present in the ENT OPD after the previous treatments have failed. Another important factor is that the cultures are mostly requested when commonly used drugs have failed to eradicate infection. Among the antibiotic, it was found that imipenem was the most effective drug against *Pseudomonas aeruginosa* followed by Ciprofloxacin. Gentamicin is also reasonably effective (70%). But as imipenem is available only in systemic form and is also very costly, ciprofloxacin and gentamicin are recommended as the first time therapy in treating pseudo-monal CSOM. Flouroquinolones such as ciprofloxacin have provided a new therapeutic possibility, offering a wide range of antibacterial activity and proven concentration in the middle ear.

The clinic treated patients tend to respond more rapidly than self treated patients. It seems that empiric topical ciprofloxacin therapy is an effective, safe and relatively inexpensive treatment for otorrhea in patients with chronic otitis media. To decrease the duration of illness and to avoid serious complications, early antibiotic treatment is necessary. The result of our study are generally in accordance with other local regional and international studies<sup>5,10,11,12</sup>.

The reason for selecting adults was that at times it is difficult to differentiate in children between recurrent attacks of acute suppurative otitis media and chronic suppurative otitis media<sup>15</sup>. CSOM is prevalent in all age groups<sup>15</sup>. It is not that common in adults but is definitely more prevalent in the young adult age group, i.e. below the age of 18 years<sup>17</sup>. In this study, 70% of the patients

belonged to the low socioeconomic group, 26% belonged to the middle socioeconomic group and 4% belonged to the upper class. In our study the main emphasis was on the frequency of *Pseudomonas aeruginosa* in patients of CSOM and its sensitivity to various antibiotics. The frequency of *Pseudomonas* in CSOM is variable in different parts of the world but is quiet similar in third world countries<sup>18</sup>. Our study shows the frequency of *Pseudomonas* to be 52.5%. In a local study, the frequency was 55.9% while another local study has shown *Pseudomonas aeruginosa* in 50.5% of 142 samples<sup>5</sup>. An Indian study shows the frequency to be 40.5%<sup>11</sup>, while an Australian study demonstrates 47.6% presence of *Pseudomonas*<sup>12</sup>.

This organism is difficult to treat by standard regimens. Its resistance to be treated with commonly available antibiotics indicates inadequate treatment<sup>13,16</sup>. In our study, *Pseudomonas* was sensitive to gentamicin in 7% of cases, Amikacin 92%, Ciprofloxacin 95%, Ceftazidime 84%, Cephoperazone 82%, Cefipime 84%, Aztreonam 83%, Imipenem 98%, Levofloxacin 97%, Augmentin 67% and Chloramphenicol in 56% of the cases. Studies performed in South Africa have suggested the use of a combination of antibiotic for *Pseudomonas* infection, where the discharge persisted in spite of the commonly used antibiotics and surgery<sup>7,8</sup>.

In a Pakistani study, Cefoperazone, Ciprofloxacin, Meropenem, Ceftazidime, Methicillin, Amoxicillin, Clavulanic acid, Gentamisin and Doxycycline were found to be more effective antimicrobials showing higher sensitivity rate in vitro against *Pseudomonas aeruginosa*.

Our finding about Ciprofloxacin efficacy in vitro are similar to a study which reported another Quinolone derivative, i.e., Ofloxacin to be an effective orally administered drug without ototoxicity, against *Staph. Aureus* and *Pseudomonas aeruginosa* the two common pathogens in middle ear infections. The study recommended the use of Ofloxacin as an alternative and effective therapy<sup>10</sup>.

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