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# Study on Aerobic Bacteria Causing Chronic Suppurative Otitis Media among the Pediatric Age Group

Y. Ajay Kumar<sup>1</sup>, T. Jaya Chandra<sup>2</sup>

<sup>1</sup>Department of ENT, GSL Medical College, Rajahmundry, AP, India; <sup>2</sup>Department of Microbiology, GSL Medical College, Rajahmundry, AP, India.

## ABSTRACT

**Objectives:** Chronic suppurative otitis media (CSOM) was reported to be the major cause of childhood morbidity. Recurrent ear discharge is the commonest clinical presentation. With these, a study was conducted to find the aerobic bacterial as well as fungal profile among the school going children

**Methods:** Study was conducted in the department of Microbiology and ENT, GSL Medical College, Rajahmundry from February 2017 to July 2017. Children with ear discharge were selected for the study. An informed written consent was obtained from the parents of all the participants. Study protocol was approved by the Institutional Ethics committee. Aural swabs were collected and send to the Microbiology laboratory for aerobic culture and sensitivity test.

**Results:** Microorganisms were isolated from 98% (219) samples. Gram negative bacilli (46.6%; 129) were isolated maximum, followed by Gram positive cocci (41%; 114) and fungi (12.3%; 34). *Pseudomonas aeruginosa* (62; 22.4%) was the leading cause of CSOM.

**Conclusion:** Decreased sensitivity was detected to Gentamycin and Cotrimoxazole, commonly used antibiotics in the form of ear drops. Hence antibiotic susceptibility testing is always advisable.

**Key Words:** Antibiotics, Cause, Isolates

## INTRODUCTION

Otitis media (OM), inflammation of middle ear and mastoid bone is one of the commonest childhood infections<sup>1</sup>. Chronic suppurative otitis media (CSOM) was reported to be the major cause of childhood morbidity<sup>2, 3, 4, 5</sup>. Recurrent ear discharge is the commonest clinical presentation of CSOM. As per the WHO report, India is the highest CSOM burden countries<sup>6</sup>. Factors such as lack of personal hygiene, introducing foreign objects are the important causes CSOM. Due to continuous discharge of pus, CSOM causes social stigma. For school going children this is practical difficulty as they are teased by friends in the class rooms.

Improper usage of antibiotics increases drug resistance as well as CSOM. With these, we conducted a study with an objective to find the aerobic bacterial as well as fungal profile among the school going children with signs and symptoms of CSOM.

## MATERIALS AND METHODS

This is a prospective study conducted in the department of Microbiology and ENT, GSL Medical College, Rajahmundry. Children with ear discharge were selected for the study. An informed written consent was obtained from the parents of all the participants. Study protocol was approved by the Institutional Ethics committee. Study was conducted from February 2017 to July 2017. Aural swabs were collected and send to the Microbiology laboratory for aerobic culture and sensitivity test.

Swabs were inoculated on Blood agar, MacConkey agar. The inoculated plates were incubated at 37°C for 24 hours. After incubation, initially growth was classified by Gram staining (GS). Battery of biochemical tests were used to identify the pathogens<sup>7, 8, 9</sup>. Coagulase test, Catalase test, Microdase test, Heat test, Bile esculin agar were used for identification of gram positive cocci (GPC). To confirm gram negative bacilli

### Corresponding Author:

T. Jaya Chandra, Associate Professor, Department of Microbiology, GSL Medical College, Rajahmundry, AP, India, Mobile: 9490646100; Fax: 0883 – 2483023; Email: chanduthgreat2014@gmail.com

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(GNB), tests such as Indole, Methyl Red, Voges Proskauer, Citrate utilization, Urease production and growth on Triple Sugar Iron agar were used. Antibiotic sensitivity test (AST) was done on Muller-Hinton agar (MHA) by Kirby-Bauer disc diffusion method<sup>7, 8, 9</sup>, *Escherichia coli* ATCC 25922 was used as the control. If fungi were suspected, growth was identified by GS, lactophenol cotton blue mount and slide culture techniques.

## RESULTS

During the study period total 223 patients aural swabs were processed. Microorganisms were isolated from 98% (219) samples. GNB (46.6%; 129) were isolated maximum, followed by GPC (41%; 114) and fungi (12.3%; 34). *Pseudomonas aeruginosa* (62; 22.4%) was the leading cause of CSOM.

## DISCUSSION

CSOM is one of the major public health problems. Due to short as well as more horizontal eustachian tube, CSOM is one of the significant problems in the children especially in the school going age<sup>10</sup>. This may be the reason for getting more number of CSOM cases to the department of ENT, GSL Medical College.

As per the Hirapure PV and Pote MK report, 60% GNB and 40% GPC were isolated among the CSOM patients<sup>11</sup>. Tesfaye G<sup>12</sup> and Iseh KR<sup>13</sup> also mentioned more GNB isolates 75% and 60.5%, respectively. In this study also GNB were isolated more compared to GPC, 46.6%, 41% respectively. In contrast, Rajat et al reported that GPC is the leading cause of CSOM<sup>14</sup>.

In the current study, *Pseudomonas aeruginosa* (22.4%; 62) was isolated maximum, followed by *Staphylococcus aureus* (17.7%; 49), *Klebsiella* species (11.5%; 32), *Streptococcus pneumoniae* (11.2%; 31) Coagulase Negative Staphylococci (7.6%; 21), *Proteus* (7.6%; 21), *Escherichia coli* (5%; 14), Enterococci (4.7%; 13). Rajat et al<sup>14</sup> reported, the *Staphylococcus aureus* (48.69%) is the leading causative agent of CSOM followed by *Pseudomonas aeruginosa* (19.89%). As per the review report, *Staphylococcus aureus* estimates were 19 – 25% in acute and CSOM<sup>15, 16, 17</sup>. Kumar et al reported that *Pseudomonas aeruginosa* is the leading causative agent of CSOM<sup>18</sup>.

Ding et al. reported that *Streptococcus pneumoniae* is the leading cause of acute OM and the authors reported 47.2% isolates<sup>19</sup>. In the current study, 31 (11.2%) *Streptococcus pneumoniae* were isolated. In one study, the authors reported 26% of *Streptococcus pneumoniae*<sup>20</sup>. Whereas study from

outside Asia reported that among the children aged 4 weeks to 18 years, the range of *Streptococcus pneumoniae* isolates were 23 – 48%<sup>21</sup>.

Due to moist environment, fungi are also common causative agent of CSOM<sup>14</sup>, *Candida* and *Aspergillus* are the common causative agents. In one of the Indian studies<sup>18</sup>, the investigators reported 15% fungal etiology among the CSOM cases. In this study also fungal (12.3%; 34) pathogens were isolated. Of the total 34 (100%) fungal isolates, 62% (21) were *Candida* species and the remaining 38% (13) were *Aspergillus* species. Among the 21 *Candida* isolates, 11 isolates were *Candida albicans* and the remaining 10 were identified as other species of *Candida*. Whereas, of the 12 *Aspergillus* isolates, 4 were identified as *Aspergillus niger* and the remaining 9 isolates were *Aspergillus fumigatus*.

All the bacterial strains were sensitive to Amikacin, Ciprofloxacin, Ceftriaxone. But the sensitivity was decreased to Gentamicin, Cotrimoxazole. Currently, drug resistance is a burning issue in the medical science. Hence AST is always advisable. AST can control the unnecessary usage of antibiotics as well as drug resistance as our study showed decreased sensitivity to Gentamycin and Cotrimoxazole.

## CONCLUSION

Decreased sensitivity was detected to Gentamycin and Cotrimoxazole, commonly used antibiotics in the form of ear drops. Hence antibiotic susceptibility testing is always advisable.

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