



SENSITIVITY AND RESISTANCE PATTERNS OF COMMON ANTIMICROBIALS IN PATIENTS WITH CHRONIC OTITIS MEDIA (MUCOSAL)

Dr. Utkarsh Shrivastava*

SENIOR RESIDENT, Department of ENT, Government medical college, Datia, M.P.*Corresponding Author

ABSTRACT **Background** - Chronic Otitis Media is a chronic inflammatory disease of the middle ear and mastoid. This study has shown the patterns of antimicrobial sensitivity & resistance of the commonly prescribed antimicrobials in patients with Chronic Otitis Media (Mucosal) visiting ENT OPD. **Methods** - Observational-Cross-Sectional Study. 332 Patients with a chronically discharging ear presenting to the ENT OPD were taken for the study. Ear Discharge was sent for culture & sensitivity testing & processed immediately in the laboratory. **Results**- In Mucosal COM, the most common organisms were Staphylococcus aureus, followed by Pseudomonas aeruginosa, Klebsiella and Enterobacter species (in that order). Staphylococcus aureus - Piperacillin + Tazobactam showed maximum sensitivity, followed by Ciprofloxacin, followed by 2nd-Gen Cephalosporins. Maximum resistance was seen in Ampicillin, followed by Clindamycin. Pseudomonas aeruginosa - most sensitive for Piperacillin + Tazobactam, followed by Imipenem. Ciprofloxacin was also found to show Intermediate sensitivity. Maximum Resistant against Ampicillin, followed by 2nd-Gen Cephalosporins was observed Klebsiella - Most sensitive for Imipenem, followed by Piperacillin + Tazobactam and Ciprofloxacin. It has shown Resistance against Ampicillin, followed by 2nd-Gen Cephalosporin and also among Chloramphenicol, Clindamycin and Azithromycin. **Conclusion** - Analysis of the antibiotic susceptibility revealed that Penicillin group of antibiotics, shown tremendous resistance. Resistance has also been shown towards older Macrolide antibiotics like Azithromycin. Cephalosporin antibiotics have shown good sensitivity, but resistance has emerged against these as-well which could be attributed to their indiscriminate usage in the recent times. Newer antibiotics like Imipenem and Meropenem and Piperacillin + Tazobactam have shown excellent sensitivity in this study. We recommend their judicious use to prevent resistance

KEYWORDS : Antimicrobials, Sensitivity, Resistance, Chronic Otitis.

INTRODUCTION

Chronic Otitis Media is a chronic inflammatory disease of the middle ear and mastoid and a major cause of "preventable" hearing loss.

The burden of C.O.M is much higher in developing nations like India.

As per the World Health Organization data, the "overall" prevalence of Chronic Otitis Media in India is greater than 4 %; and among this the highest prevalence is among the school going children, which is greater than 7% (in India) [1].

Several bacterial species, both Gram Positive and Gram Negative bacteria are held responsible for causing infection in the middle ear cleft. Analysis of the bacterial agents along with the antimicrobial sensitivity & resistance is essential to counter the emergence of "Resistant Strains".

This study was conducted to analyse the changing trends in patterns of antimicrobial resistance and sensitivity among the commonly prescribed antibiotics in organisms causative of infection in patients with C.O.M.

Methods:

- Study Design :- Observational-Cross-Sectional Study
- Source of data:- Patient with a chronically discharging ear presenting to the ENT Out Patient Department
- Sample-size:- All the patient with a Chronically Discharging Ear visiting ENT OPD
- Duration :- 12 months

Inclusion criteria :- Ear-discharge / swabs from all patient of both sexes & all age groups presenting with chronically discharging ear (diagnosed as COM mucosal) to ENT O.P.D were taken for this study.

Exclusion criteria:- Patient presenting with ear discharge of short-duration (less than 2 weeks) or Patient with a chronically-discharging ear(s) (more than 2 weeks - According to W.H.O) receiving antibiotics at the time of presentation or 2 weeks prior to presentation at ENT out-patient department & patient who did not give consent for participation were excluded from this study.

DISCUSSION -

This study was undertaken to analyze the changing trends in bacteriology and antimicrobial susceptibility of the antimicrobial drugs commonly being used to treat patients with Chronic Otitis Media (Mucosal). In our study out of 332 patients, most of the patients (175), were 41-60 year old. Out of 332 patients, 167 were male and 165

were females. In Mucosal C.O.M, the most common organisms were Staphylococcus aureus, followed by Pseudomonas aeruginosa, Klebsiella and Enterobacter species (in that order).

Sensitivity Patterns -

Staphylococcus aureus - The antibiotics showing maximum sensitivity were - Piperacillin + Tazobactam, followed by Ciprofloxacin, followed by 2nd-Gen Cephalosporins (Mostly showing intermediate sensitivity).

Pseudomonas aeruginosa - most sensitive for Piperacillin + Tazobactam, followed by Imipenem. Ciprofloxacin was also found to show Intermediate sensitivity.

Klebsiella - Most sensitive for Imipenem, followed by Piperacillin + Tazobactam and Ciprofloxacin.

Enterobacter Species - Shows almost equal sensitivity for Levofloxacin, Cephalosporins (2nd-Gen, 3rd-Gen & 4th-Gen) and Ampicillin + Sulbactam.

This co-related with the study of Ashok Shrama et al (2018)2 which also showed the most common organisms as Staph. aureus having sensitivity for Vancomycin followed by Linezolid and Gentamicin. They also showed Pseudomonas aeruginosa to be susceptible to Amikacin and Ciprofloxacin.

Our results also co-related with the results of Loy AHC et al3 (2002) showing most common organisms being Staph. aureus being susceptible to 2nd-Gen Cephalosporins, Ciprofloxacin, Piperacillin and also Amikacin; and Pseudomonas showing susceptibility towards 1st-Gen Cephalosporin, Cloxacillin and Clindamycin. All of the organisms in their study were showed susceptibility to Topical Gentamicin as well.

Our findings were also relatable to study of Hiremath SL et al4, who showed their most common isolate being Pseudomonas aeruginosa and 2nd most common isolate Staphylococcus aureus being susceptible to Chloramphenicol and Ciprofloxacin.

Other organisms in our study were - Enterobacter species which still showed susceptibility to Ampicillin + sulbactam.

In Mucosal CSOM, the most common organisms were Staphylococcus aureus, followed by Pseudomonas aeruginosa, Klebsiella and Enterobacter species (in that order)

Resistance Patterns -

Staphylococcus aureus - It was also shown to be most Resistant against Ampicillin followed by Clindamycin.

Pseudomonas aeruginosa -. The organism was shown to be most Resistant against Ampicillin, followed by 2nd-Gen Cephalosporins. Our study showed similarities with the study of Rama Rao M.V et al5 (1980) where Staph. aureus and Pseudomonas showed resistance to Penicillin group, Tetracyclins and Streptomycin.

Klebsiella - It has shown Resistance against Ampicillin, followed by 2nd-Gen Cephalosporin and also among Chloramphenicol, Clindamycin and Azithromycin.

Enterobacter Species - Resistance patterns were observed against Amoxicillin, Ampicillin and Clindamycin.

The results for Klebsiella and Enterobacter species correlated with the works of VK Shrivastav et al6 (1979) where Klebsiella and E.coli species showed resistance to Erythromycin Laxmipati G et al (1963) had already shown emerging resistance of these common species (Staph aureus / Pseudomonas / Klebsiella / Proteus) towards Penicillin group of antibiotics. This was also noted in our study, and is because of the widespread indiscriminate usage of Penicillin group of antibiotics in the past decades.

Other minor bacteria like Enterobacter species which showed maximum resistance towards Ampicillin, Amoxicillin (although "Ampicillin with Sulbactam" still showed sensitivity) and emerging resistance to 1st Gen Cephalosporins as well.

In the 2018 study of H. Ghogare et al8 have shown that there is increasing resistance of Pseudomonas to Fluoroquinolones (Ciprofloxacin 53% susceptibility and Levofloxacin 45% susceptibility only), though in our study we found Levofloxacin to be sensitive in 83% isolates of pseudomonas.

RESULT-

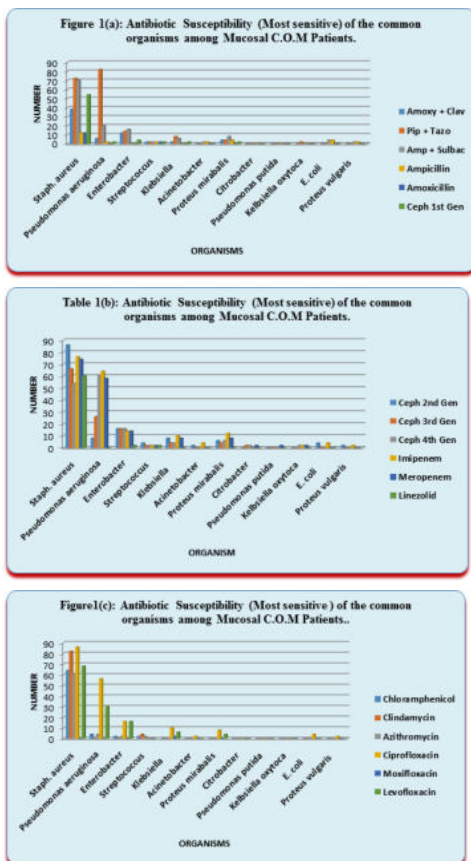


Figure 1 (a/b/c) - In Mucosal C.O.M, the most common organisms were Staphylococcus aureus, followed by Pseudomonas aeruginosa, Klebsiella and Enterobacter species (in that order)

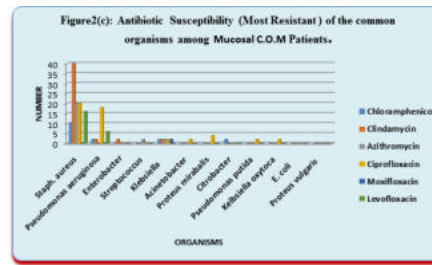
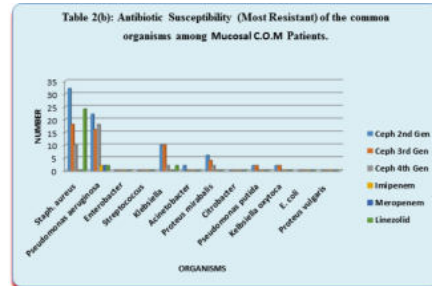
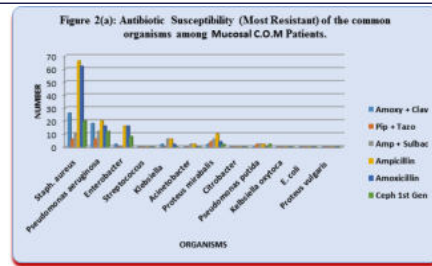


Figure 2 (a/b/c) - In Mucosal C.O.M, the most common organisms were Staphylococcus aureus, followed by Pseudomonas aeruginosa, Klebsiella and Enterobacter species (in that order)

CONCLUSION:

This clinical study has shown that in the our catchment area, the most prevalent organisms 'overall' causing infections in patients with Chronic Otitis Media were Staphylococcus aureus, followed by Pseudomonas aeruginosa, Klebsiella, Proteus Mirabilis (more commonly seen in Squamous as compared to Mucosal) and Enterobacter species (More common in Mucosal disease).

Other organisms isolated in a minor proportion of the cases were Streptococcus, Acinetobacter, Citrobacter. And very rarely E.coli, Pseudomonas putida and Proteus vulgaris were seen.

Analysis of the antibiotic susceptibility revealed that Penicillin group of antibiotics, specifically older antibiotics like Ampicillin have shown tremendous resistance. Our common bacterial isolates were resistant to these drugs. Resistance has also been shown towards older Macrolide antibiotics like Azithromycin. Cephalosporin antibiotics have shown good sensitivity, but resistance has emerged against these as-well which could be attributed to their indiscriminate usage in the recent times. Newer antibiotics like Imipenem and Meropenem and Piperacillin + Tazobactam have shown excellent sensitivity in this study. We recommend their judicious use to prevent resistance.

We strongly believe that antimicrobial treatment guided by culture and sensitivity testing can help to counter the problem of emerging antimicrobial resistance.

REFERENCES:

1. W.H.O - Chronic suppurative otitis media : burden of illness and management options. 1.Otitis media, Suppurative 2.Disease management 3.Chronic disease – epidemiology 4.Cost of illness I.Acuin, Jose II.World Health Organization. ISBN 92-4-159158
2. Ashok Sharma, Department of ENT, Sanjay Gandhi Memorial Hospital, Delhi, India, 2018, Bacteriology and antibiotic sensitivity of chronic suppurative otitis media in a government hospital; Indian Journal of Otolaryngology Year : 2018 | Volume: 24 | Issue Number: 4 | Page: 214-218
3. Loy AHC, Tan AL, Lu PKS. Microbiology of chronic suppurative otitis media in Singapore. Singapore Med J 2002; 43(6):296-299.
4. Hiremath SL, Kanta RC, Yeshwanathrao M, Vasantha Kumar CM. Aerobic bacterial isolates of CSOM and their antibiotic sensitivity pattern. The Indian Practitioner 2001; 54(7):486-489.
5. Rama Rao MV, Jayakar PA. Bacteriological study of chronic suppurative otitis media. Indian Journal of Medical Association 1980; 75:30-33.

6. Srivastava VK, Agarwal SK, Malik G. Chronic suppurative otitis media in children. Indian Journal of Paediatrics 1979; 46(3&1):363-367.
7. Lakshmi pathi G, Bhaskaran CS. Bacteriology of chronic suppurative otitis media. Journal of Indian Medical Association 1965; 45(8):436-440.
8. Harish Ghogare et al; Deptt of Microbiology MGM Medical college, Aurangabad; 2018; Microbiological profile of CSOM; International Journal of Current Microbiology and Applied Sciences ISSN: 2319-7706 Volume 7 Number 10 (2018).