ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 2, 2023

Original Research Article

ORGANISMS CAUSING CHRONIC SUPPERATIVE OTITIS MEDIA AND THEIR ANTIBIOTIC RESISTANCE PATTERN IN A TERTIARY CARE HOSPITAL IN INDIA. (GOVERNMENT VELLORE MEDICAL COLLEGE, ADUKKAMPARAI)

Dr. G. Moulya[1], Dr. K.N. Praveenkumar[2], Dr. R. Revathi[3]

[1]First Year Postgraduate, Department of ENT, Government Vellore Medical College & Hospital, Vellore, Tamil Nadu, India.
[2]Assistant Professor, Department of ENT, Government Vellore Medical College & Hospital, Vellore, Tamil Nadu, India.
[3]First Year postgraduate, Department of ENT, Government Vellore Medical College & Hospital, Vellore, Tamil Nadu, India.

Corresponding Author
Dr. K.N. Praveenkumar, Assistant Professor, Department of ENT, Government Vellore Medical College & Hospital, Vellore, Tamil Nadu, India.

Article received: 05 December 2022 Article accepted: 28 January 2023

ABSTRACT

Background
Persistent ear discharge in chronic otitis media leads to various complications, hearing loss, and hinders with the success rate of surgery.[1] Recent and updated culture and sensitivity data are an imperative tool in achieving this goal. Empirical antibiotics lead to the development of resistant organisms.[2]

Aims
This study aimed to identify the most common organisms in chronic otitis media and to study the current sensitivity and resistance patterns to the antibiotics in our hospital.

Methods
This is a cross sectional descriptive study. Datas were collected for patients visiting the outpatient department of otorhinolaryngology from December 2021 to October 2022, who underwent culture and sensitivity for ear discharge.

Results
Pseudomonas aeruginosa was the most common organism isolated and showed the sensitivity toward injectable cephalosporins. Staphylococcus aureus was the second most common organism.

Conclusion
The study data indicate a shift in the antibiotic drug policy for our department. Culture and sensitivity should be made mandatory for all ear discharges and we should have antibiotic protocols based on recent culture and sensitivity data.

Keywords: Chronic otitis media, culture and sensitivity, emerging trends, organisms.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 2, 2023

INTRODUCTION

Chronic supperative otitis media CSOM is a long standing infection of a part or a whole of middle ear cleft characterised by ear discharge and a permanent perforation.[3] Clinically it is divided into tubotympanic and atticoantral disease.

Tubotympanic disease/ safe disease/ benign type involves anterioinferior part of middle ear cleft (Eustachian tube and mesotympanum) and is associated with central perforation. There is no risk of complications.

Atticoantral/ unsafe/ dangerous type involves posterosuperior part of the cleft (attic, antrum and mastoid) and is associated with attic or marginal perforation. The disease is often causes bone eroding process such as cholesteatoma, granulation or osteitis.[4] Risk of complications is very high in this variety.

CSOM is the single most important cause of hearing impairment in developing countries like India.[5] In developing countries because of poor socioeconomic standards, poor nutrition and lack of health education, the incidence and prevalence of CSOM is higher and it became a burden to health care system.[6] May result in permanent disability and potentially fatal complications which can have a profound impact on the society and health care system, affecting all ages.

The knowledge of the local pattern of infection is essential to enable efficacious treatment of this disease and thereby reduces the potential risk of complications.[5] Bacterial predominance and their antibiotic sensitivity pattern change over time. The prevalence and antibiogram of micro organisms in CSOM have been reported to change with time, geographical area and with underlying comorbidities, probably because of inappropriate usage of antibiotics.[7] Early and effective treatment place a major role in reducing the consequence of CSOM and duration of illness.[2] The emergence of antibiotic resistance strains is leading to increasing treatment failure.

Allergy, previous history of acute otitis media, and inhalation of passive smoke were demonstrated to be risk factors of chronic otitis media. In recent decades, inappropriate antibiotic treatment, frequent attacks of upper respiratory tract infection (URTI), low socioeconomic status, and poor living quality have been common factors leading to CSOM(3) . Besides, male sex, high body mass index (BMI) and smoking increased the risk to develop CSOM. It is apparent that studies on adult patients with refractory CSOM are urgently needed.[8]

The distribution of microbes isolated from otitis media (OM) changed over time and could be altered with medical intervention, such as pneumococcal vaccination. Different serotypes of Streptococcus pneumoniae was identified in children suffered from OM. The implementation of pneumococcal vaccination and stewardship of prescribed

The above graph shows epidemiological study on hearing loss and its demographic characteristics- published on May 2016 antibiotics for respiratory infections possibly contributed to the alterations of bacterial colonization, pathogen distribution, and anti-microbial resistance in subjects with OM, rhinosinusitis and tonsilitis.Bacteria were the most common pathogens isolated from CSOM, and fungus was occasionally reported.[9] Among all pathogens of CSOM, Pseudomonas aeruginosa and Staphylococcus aureus prevailed as the furthermost common pathogens in recent studies.

Aural toilet, topical and systemic antibiotics have been the mainstay approach to the cure of CSOM.[6] Inadequate response to empirical therapy would lead to intractable disease. The accompanied complication of cholesteatoma is frequently manifested by diffused mucosal invasion

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 2, 2023

and intra-cranial invasion and needs prompt surgical interventions to overt potentially life-threatening and destructive conditions.For patients of CSOM, persistent symptoms or signs of infection signify poorly response to treatment, and are designated as “recalcitrant” or “difficult-to-treat” CSOM.[3]

OBJECTIVE

1. Identifying the common aetiology - organism causing CSOM.
2. Organism causing CSOM in patients with comorbidities Type 2 Diabetes mellitus.
3. Knowing some risk factors for CSOM.
4. Understanding the Emerging pattern of antibiotic resistant organisms.
5. Framing antibiotic drug policy based on the prevalent organism and antibiotic resistance pattern for department of ENT in a tertiary care hospital.
6. Early and effective treatment based on the knowledge of causative organism and their antibiotic sensitivity is essential for immediate clinical recovery.
7. Reducing the potential risk and further consequence of CSOM.
8. Decreasing the morbidity and burden of hearing loss caused by CSOM.
9. Microbiological predominance and their antibiotic sensitivity pattern changes over time due to climate, geographic factors and antibiotic usage. Hence it is prudent for health care person to conduct periodically the microbiological study of CSOM in order to install effective treatment protocols for the population. We believe that our data may contribute to an effective management of CSOM.

MATERIALS & METHODS

Clearance from concerned authority and informed consent from the patient or parent/ guardian to be obtained. 60 chronically diagnosed patients with CSOM formed the subject matter of the study. Detailed history and examination findings should be noted.

It is prospective observational study conducted in a tertiary care hospital in India. 60 patients of CSOM who presented to the ear, nose and throat department of Government Vellore medical college is the study population. External auditory canal EAC of each patient have to be cleaned and two sterile ear swabs have to be used to collect ear discharge from CSOM patients in each ear. Utmost care to be taken to avoid any contact with the EAC. The collected specimens ought to be transported immediately to microbiology laboratory for further processing. One pus swabs for gram stain and cultured on blood agar, Mac Conkeys agar, chocolate agar, anaerobic blood agar and brain heart infusion agar. Incubation at 37 degree Celsius for overnight. The bacteria identified and confirmed with standard biochemical tests. Antibiotic susceptibility was carried out using Kirby Bauer disk diffusion method. Results were interpreted using Clinical Laboratory Standards Institute (CLSI) guidelines. Second ear swabs for fungal identification using KOH mount and culture using SDA with incubation at 25 degree Celsius for two to three weeks. Fungi identified using microscopic examination.

Inclusion Criteria

1. Persons with consent for pus culture
2. Male, female and others are the study population.
3. Age group of 6months to 70 years are taken into consideration.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 2, 2023

4. Ear discharge for more than 3 months.
5. Either unilateral or bilateral ear discharge.
6. Patients with comorbidities

Exclusion Criteria

1. Person not given consent.
2. Patients on topical or systemic antibiotics for 1 week prior to the test.
3. Patients with ear discharge less than 3 months
4. Ear discharge with intact tympanic membrane.
5. Patient who had already diagnosed with otitis external or malignancy in the ear at the time of presentation are excluded.

Implication

1. Identifying the organism and treatment with specific antibiotics
2. Framing antibiotic drug policy for tertiary care hospital.
3. Knowledge about antibiotic resistance pattern.
4. Reducing the emergence of antibiotic resistance.
5. Increase the knowledge, attitude and practice (KAP) regarding ear disease.
6. Reducing the prevalence of CSOM
7. Decreasing the incidence and prevalence of CSOM induced hearing loss
8. Specific antibiotic treatment, reduces the duration of illness.
9. Identifying the prevalence of ESBL (Extended spectrum beta lactamases) and MBL (Metallobetalactamases) in CSOM
10. Health promotion among population
11. Early diagnosis and treatment

RESULTS

The present study was conducted over the period of December 2021 to October 2022, with total number of 60 samples were collected and sent for culture and sensitivity. Out of which 36 where males and 24 females. Most of the patients in our study were in the age group of 10-20 years. Maximum number of patients presented with unilateral ear discharge for past 5-6 months.

Out of 60 samples were clinically diagnosed as Chronic suppurative otitis media, 44 samples cultured organisms and 16 samples found to have normal flora or Negative culture. Out of 44 samples, 22 found to be Pseudomonas aeruginosa species, 6 were Staphylococcus, 6 were Klebsiella, 4 samples were Enterobacter, 4 were Acineobacter and 2 samples were found to candida.

Among 20 Pseudomonas samples, maximum samples (20) were resistant to first line antibiotics Ampicillin, Amoxycillin, Amoxycillin with clavulanic acid and first generation cefalosporin drugs like Cefazolin. The 20 Pseudomonas samples were found to be sensitive to Injectable antibiotics like Cefotaxime, Ceftazidime, Cefoperazone sulbactum, Gentamicin.

Out of 6 Staphylococcus samples, 4 were found to be Methicillin resistant Staphylococcus species, resistant to Cefotaxime, Cephalexin, Levofloxacin, Tetracycline and Erythromycin. Sensitive to Vancomycin and Linezolid. Out of 6 Klebsiella samples, all 6 were resistant to

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 2, 2023

Amphicillin. 4 were sensitive to Amoxycillin and Clavulanic acid, Cefazolin, Ceftazidime and Cefepime.

Out of 4 Enterobacter species, all 4 were resistant to Ampicillin and Cefazolin, found to be sensitive to Injectable antibiotics Ceftazidime, Cefotaxime and Gentamicin. Out of 4 Acinetobacter species, all 4 were resistant to Amoxycillin and Clavulanic acid, Amphicillin and Ceftazidime. Sensitive to Gentamicin.

Male	Female
36	24
Table 1: Based on the Gender distribution	

1-10 Years	10-20 Years	20-30 Years	30-40 Years	40-50 Years	50-60 Years	60-70 Years
2	22	10	12	10	2	2
Table 2: Based on the age distribution						

Pseudomonas aeruginosa	22
Normal flora/ No growth	16
Staphylococcus	6
Klebsiella	6
Enterobacter	4
Acineobacter	4
Candida	2
Table 3: Based on the Organisms obtained for culture	

DISCUSSION

ENT practitioners, pediatricians, and general practitioners commonly see COSM. and If not treated accurately it may lead to complications.[7] Early bacteriological diagnosis of all cases will assure accurate and appropriate effective therapy. For selection and prescription of antibiotics, antibiotic efficacy, bacterial resistance, safety, risk of toxicity and the cost is to be considered.[9] Biofilm formation is emerging as a factor for persistence of the infection. Knowledge about the most common local microbial organism and the antibiotic susceptibility pattern is essential for better treatment to patients. formulating a protocol for empirical antibiotic therapy and having antibiotic drug policy for particular department has became mandatory nowadays. [10] Our study was conducted over the period of December 2021 to October 2022, with total number of 60 samples were collected and sent for culture and sensitivity. Out of which 36 where males and 24 females. Most of the patients in our study were in the age group of 10-20 years. Maximum number of patients presented with unilateral ear discharge for past 5-6 months. Out of 60 samples who were clinically diagnosed as Chronic suppurative otitis media, 44 samples cultured organisms and 16 samples found to have normal flora or Negative culture. Out of 44 samples, 22 found to be Pseudomonas aeruginosa species, 6 were Staphylococcus, 6 were Klebsiella, 4 samples were Enterobacter, 4 were Acineobacter and 2 samples were found to candida.

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 2, 2023

Among 20 Pseudomonas samples, maximum samples (20) were resistant to first line antibiotics Ampicillin, Amoxycillin, Amoxycillin with clavulanic acid and first generation cefalosporin drugs like Cefazolin. The 20 Pseudomonas samples were found to be sensitive to Injectable antibiotics like Cefotaxime, Ceftazidime, Cefoperazone sulbactum, Gentamicin. [6]. Out of 6 Staphylococcus samples, 4 were found to be Methicillin resistant Staphylococcus species, resistant to Cefotaxime, Cephalexin, Levofloxacin, Tetracycline and Erythromycin. Sensitive to Vancomycin and Linezolid. Out of 6 Klebsiella samples, all 6 were resistant to Amphicillin. 4 were sensitive to Amoxycillin and Clavulanic acid, Cefazolin, Ceftazidime and Cefepime. Out of 4 Enterobacter species, all 4 were resistant to Ampicillin and Cefazolin, found to be sensitive to Injectable antibiotics Ceftazidime, Cefotaxime and Gentamicin. Out of 4 Acinetobacter species, all 4 were resistant to Amoxycillin and Clavulanic acid, Amphicillin and Ceftazidime. Sensitive to Gentamicin.

CONCLUSION

Pseudomonas aeruginosa was the most common isolate organism causing Chronic suppurative otitis media followed by Staphylococcus aureus. Pseudomonas aeruginosa maximum samples (20) were resistant to first line antibiotics Ampicillin, Amoxycillin, Amoxycillin with clavulanic acid and first generation cefalosporin drugs and sensitive to Injectable antibiotics like Cefotaxime, Ceftazidime, Cefoperazone sulbactum. Followed by second most common Staphylococcus were found to be Methicillin resistant Staphylococcus species. Other organisms include Klebsiella Enterobacter species, Acinetobacter species. The wide use of antibiotics along with other factors lead to change in organism resistant pattern. Laying antibiotic drug policy within local population helps in the empirical management of patient and thereby complications of CSOM is reduced.

REFERENCES

[1] Gaur RS, Mathew J, Varghese AM, et al. Microbiological pattern of ear swabs in chronically discharging ears in a Tertiary Care hospital in India. Indian Journal of Otology 2013;19(2):51.

[2] Gangwar N, Siddapur GK, Sharma S. Clinical implications of culture and sensitivity data in chronic otitis media. Indian Journal of Otology 2021;27(2):101.

[3] Juyal D, Sharma M, Negi V, et al. Pseudomonas aeruginosa and its sensitivity spectrum in chronic suppurative otitis media: a study from Garhwal hills of Uttarakhand State, India. Indian Journal of Otology 2017;23(3):180.

[4] Clarke S, Richmond R, Worth H, et al. Effect of a participatory intervention in women's self-help groups for the prevention of chronic suppurative otitis media in their children in Jumla Nepal: a cluster-randomised trial. BMC Pediatrics 2019;19:1-10.

[5] Toleti S. Bacterial profile and antibiotic susceptibility pattern of chronic suppurative otitis media in a tertiary teaching hospital, chinakakani, Andhra Pradesh. IJIRR 2016;3(10):2866-8.

[6] Jensen RG, Koch A, Homøe P. The risk of hearing loss in a population with a high prevalence of chronic suppurative otitis media. Int J Pediatric Otorhinolaryngol 2013;77(9):1530-5.

[7] Bellad SA, Kavi A, Mudhol RS. Prevalence of chronic suppurative otitis media among school children residing in Rural Area of Belagavi, South India. Indian J Otolaryngol Head Neck Surg 2019;71:1549-52.

[8] Chong LY, Head K, Webster KE, et al. Systemic antibiotics for chronic suppurative otitis media. Cochrane Database of Systematic Reviews 2021;(2).

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 2, 2023

[9] Swain SK, Lenka S, Dubey D, et al. Microbiology of chronic otitis media-a review. DY Patil Journal of Health Sciences 2022;10(2):67.

[10] Sahu MC, Swain SK. Surveillance of antibiotic sensitivity pattern in chronic suppurative otitis media of an Indian teaching hospital. World Journal of Otorhinolaryngology-Head and Neck Surgery 2019;5(02):88-94.