

ORIGINAL RESEARCH

Pattern of Bacterial Isolates in the Middle Ear Discharge of Patients with Chronic Suppurative Otitis Media: A Prospective Study

Nitin Kumar Jain¹, Abhay Sinha², Hemant Ahluwalia³

ABSTRACT

Introduction: Chronic Suppurative otitis media (CSOM) is a common cause of hearing impairment, especially in rural population. This study was carried out to know about the bacterial flora and antibiotic sensitivity for better management of the disease and to reduce morbidity due to CSOM.

Materials and Methods: This prospective study included 100 patients of Chronic Suppurative Otitis Media attending the ENT OPD at UPRIMS and R, Saifai, Etawah, U.P. over a period of 11 months. The samples were immediately sent to the microbiology laboratory for pus culture and sensitivity studies. Patients presenting with tympanic perforation and ear discharge of more than 3 months were studied. Middle ear swabs obtained aseptically were processed for culture and the isolates identified by standard procedures. Antibiotic sensitivity test of cultured bacterial growth is undertaken to know the susceptibility of the causative organism.

RESULT: Of the 170 samples, 102 were culture positive where *Pseudomonas aeruginosa* was the most common pathogen followed by *Staphylococcus aureus*. Most of the cultured organisms in our study were sensitive to drug Ciprofloxacin.

Conclusion: The study suggests that the common etiological agents for Chronic Suppurative Otitis Media were *Pseudomonas aeruginosa* followed by *Staphylococcus aureus*. Ciprofloxacin is an important drug for reducing the middle ear discharge of active CSOM as it is cheap, less ototoxic and widely available as topical preparations.

Keywords: Chronic Suppurative otitis media, ear discharge, *Pseudomonas aeruginosa*.

How to cite this article: Nitin Kumar Jain, Abhay Sinha, Hemant Ahluwalia. Pattern of Bacterial Isolates In The Middle Ear Discharge Of Patients With Chronic Suppurative Otitis Media: A Prospective Study. International Journal of Contemporary Medical Research. 2015; 2(2):345-347

¹Senior resident, ²Professor and Head, ³Associate professor, Department of Otorhinolaryngology and Head and Neck Surgery, UPRIMS and R, Saifai, Etawah, Uttar Pradesh, India

Corresponding author: Dr. Nitin Kumar Jain, M.S. ENT, senior resident, Room no.105, SR Hostel, UPRIMS & R, Saifai, Etawah, Uttar Pradesh, India

Source of Support: Nil

Conflict of Interest: None

INTRODUCTION

Middle ear disease is the most common infection of ear and it occurs commonly in developed and developing countries like India^{1, 2}. It is more frequently seen in lower socioeconomic group. Different studies on microbiology of middle ear infection have shown that bacterial is the most common. The most common organism isolated from different studies are pseudomonas, staphylococcus and proteus species.³⁻⁶

The purpose of the present study was to determine the type of bacteria associated with CSOM and their antibiotic susceptibility pattern in rural area.

MATERIALS AND METHOD

The study was a prospective study carried out at Uttar Pradesh rural institute of medical sciences and research, Saifai, Etawah, U.P., among total 100 patients with ear discharge of more than 3 months attending the Ear Nose and Throat OPD after obtaining approval from ethical committee. The study was conducted for a period of 11 months from February 2014 to January 2015. The inclusion criteria include:- Patient with active mucosal disease and those patients who

were not take any antibiotic medication either topical or systemic for at least 7 days. Specimens for pus culture were collected, under illumination, by swabbing the discharging ears with a sterile cotton swab and sent to the microbiology laboratory without delay. Due care was taken to avoid contamination while collecting pus from ear. In bilateral discharging ear, ear swabs were taken separately from both the ears.

The middle ear discharge was sent for microscopy, culture and sensitivity. The microcopy is done. Gram stain and Potassium hydroxide mount. The samples were inoculated for bacterial culture on Blood agar, MacConkey's agar and Chocolate agar media and were incubated at 37°C for 24 hours.⁷the samples was also inoculated on SDA (Sabouraud's dextrose agar) for fungal culture. The organism is identified using gram stain, culture and clinical characteristics (Collee et al.)⁷ The antimicrobial susceptibility of the bacterial isolates was assessed by the Kirby- Bauer's disc diffusion method.

STATISTICAL ANALYSIS

Data were analyzed using SPSS version 21. Results were made using descriptive statistics.

RESULT

In our study out of 100 patients 35 were males and 65 were females (Table 1) with in age range of 2 to 70 years. Out of total 170 samples collected from 100 patients suffering from CSOM in our study, 102 samples were culture positive. Majority of the patients (65 %) were in the age group of 11–30 years (Table-2). The right ear was involved in 20 cases and left ear in 24 cases and 63 cases of bilateral ear discharge, in which pus taken separately from both ears as shown in Table 3. The types of microorganism pattern is shown in Table 4 The incidence of various aerobes isolated from 170 specimens, *Pseudomonas aeruginosa* was the most predominant species in 55 cases (53.92%), followed by *Staphylococcus aureus* 30 cases (29.41%) next *Escherichia coli* was present in 12 cases (11.76%) and *Proteus*, *Klebsiella* were seen

in 5 cases each (4.90%) (Table 4).

DISCUSSION

Middle ear disease is the most common infection of ear and it occurs commonly in developed and developing countries like India^{1, 2, 8}. It is more frequently seen in lower socioeconomic group. Different studies on microbiology of middle ear infection have shown that bacterial is the most common. A high incidence of the disease in the pediatric age group which constituted more than 50% was also reported in our study. High prevalence of CSOM in children may be attributed to the fact that they are more prone to upper respiratory tract infections (URTIs). Furthermore, cold weather pre-disposes children to URTI^{9, 10}.

Sex	Number
Male	35
Female	65

Site	Number
Right	20
Left	24
Bilateral	63

Age	Number
<10	2
10-20	47
21-30	18
31-40	16
41-50	8
51-60	7
61-70	2

Table -1: Sex distribution of patients; **Table-2:** Age distribution of patients; **Table-3:** Site distribution

In our study, a female were more commonly affected than males as that of study performed by Loy et al¹¹ and Mansoor et al¹², but differs from study performed by Ahmad et al¹³ which showed male 57.3% and female 42.7%.

In our study Out of the 170 swabs 102 yielded positive cultures, on nutrient agar and MacConkey's medium, for different aerobic bacteria and 68 was culture negative. There were no fungal isolates on these media. The commonest bacteria isolated were *Pseudomonas aeruginosa* followed by *S.aureus*, *E.coli* and *proteus* and *klebsiella*. This contrasts with another study carried out by B. Ahmad ET al¹⁴, the commonest organism in CSOM was *staphylococcus* followed by *Pseudomonas aeruginosa* and *Streptococci*.

Ciprofloxacin was found to be effective in eradicating most of the gram negative bacteria.

In our study it is seen that a cheaper drug like ciprofloxacin is almost 100% effective in treating middle ear discharge as *P. aeruginosa* is most common organism.¹⁵

Bacterial isolate	No.	Percentage
<i>Pseudomonas Aeruginosa</i>	55	53.92 %
<i>Staphylococcus aureus</i>	30	29.41 %
<i>Escherichia Coli</i>	12	11.76 %
<i>Proteus-mirabilis, Klebsiela</i>	5	4.90 %

Table-4 Microbiological profile of CSOM

CONCLUSION

Our study indicates that there can be a variation in the organisms causing CSOM and their susceptibility pattern based on whether, area and ethnicity of a patient. Regular monitoring of the microbiological profile of CSOM along with clinical correlation is essential. It is concluded that gram negative aerobic bacteria especially *pseudomonas* is significantly associated with CSOM, in this part of north India and ciprofloxacin is a preferred choice in the treatment of CSOM because of its less cost, easy availability and no hearing side effect as topical and oral preparations.

REFERENCES

1. El-Gendy GD. The incidence of otitis media with effusion in Menoufiya school children. MD Thesis, Faculty of Medicine, Menoufiya University 1998.
2. St Sauver J, Marrs CF, Foxman B, Somsel P, Madera R, Gilsdorf JR. Risk factors for otitis media and carriage of multiple strains of *Haemophilus influenzae* and *streptococcus pneumoniae*. *Emerg Infect Dis* 2000;6:622-30.
3. Arguedas A, Loaiza C, Herrera JF. Antimicrobial therapy for children with chronic suppurative otitis media without cholesteatoma *Paediatr Infect Dis J* 1994; 13: 878-82.
4. Attalah MS. Microbiology of chronic suppurative otitis media with cholesteatoma. *Saudi Med J* 2000;21:924-7
5. Fliiss DM, Dagan R, Meidan N, Leiberman A. Aerobic bacteriology of chronic suppurative otitis media without cholesteatoma in children. *Ann Otol Rhinol Laryngol* 1992;101: 866-9.
6. Anifasi WB, Tumushime – Buturo CG. Bacteriology and drug sensitivity of chronic suppurative otitis media in central hospital in Zimbabwe. *Cent Afr J Med* 1989; 35: 481-3.
7. Collee JG, Duguid JP, Fraser AG, Marmion BP, Simmons A. Laboratory strategy in the diagnosis of infective syndromes. Mackie and McCartney Practical Medical Microbiology. Churchill Livingstone: Singapore. 14th ed. 1996: 53-94.
8. Acuin J. Global burden of disease due to chronic Suppurative otitis media: Disease, deafness, deaths and DALYs Chronic Suppurative Otitis Media–Burden of Illness and Management Options. Geneva: World Health Organisation; 2004. p. 9-23. (Accessed August 29, 2012, at http://www.who.int/pbd/deafness/activities/hearing_care/otitis_media.pdf).
9. Gordon MA, Grunstein E, Burton WB. The effect of the season on otitis media with effusion resolution rates in the New York Metropolitan area. *Int J Pediatr Otorhinolaryngol* 2004; 68: 191-5.
10. Rovers MM, Straatman H, Zielhuis GA, Ingels K, van der Wilt GJ. Seasonal variation in the prevalence of persistent otitis media with effusion in one year old infants. *Paediatr Perinat Epidemiol* 2000; 14:268-74.
11. Loy AH, Tan AL, Lu PK. Microbiology of chronic Suppurative otitis media in Singapore. *Singapore Med J*2002; 43: 296-9.
12. Mansoor T, Musani MA, Khalid G, Kamal M. *Pseudomonas aeruginosa* in chronic suppurative otitis media: Sensitivity spectrum against various antibiotics in Karachi. *J Ayub Med Coll Abbottabad* 2009; 21:120-3.
13. Ahamed A, Usman j, Hashim R. Isolates from chronic Suppurative otitis media and their antimicrobial sensitivity. *Pak Armed Forces Med J* 1999;49:82-5.
14. Ahmed B, Hydri AS, Afridi AAK, Ejaz A, Farooq S, Zaidi SK. Microbiology of ear discharge in Quetta. *J Coll Physicians Surg Pak* Sep 2005;15:5834.
15. Yildirim, H. Erdem, S. Kilic, S. Yetiser and A. Pahsa. Effect of Climate on the Bacteriology of Chronic Suppurative Otitis Media. *The Annals of Otolaryngology, Rhinology, and Laryngology* 2005; 114:652-655.