

AUDIT OF MICROBIOLOGICAL PROFILE OF 95 SERIAL CASES PRESENTING WITH OTORRHEA TO ENT OPD AT TERTIARY CARE HOSPITAL

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ABSTRACT:

Otorrhea is a common ENT presentation affecting all the age groups which requires accurate assessment. The etiology of ear discharge is of complex nature, majority being aerobic bacteria, and the rest are anaerobes, fungi and mixed infections. Therefore, the need to determine the cause behind the discharge and to find out the nature and microorganism related to it becomes important. The current study is being conducted to determine the microbial flora in patients presenting with otorrhea and guide towards empirical treatment based on the susceptibility of the safest antimicrobial to the causative organism. The current study is a prospective observational (descriptive) study which involves a preliminary mycobacterial analysis of the ear discharge in a sample of 95 patients presenting with otorrhea. The commonest age group affected in the current study is 20-35 years with males commonly affected. Most common amongst the bacteria are *pseudomonas aeruginosa* (18.94%) and coagulase negative *staphylococcus aureus* (14.73%). Mycological profile revealed the predominance of *Aspergillus species* (9.47%). most common diagnosis was CSOM mucosal (84.21%) followed by CSOM squamous (11.58%). Other less common diagnosis included otomycosis (3.16%) and otitis externa (1.05%). The results of the current study is in concurrence with the other literature available on the microbial flora of otorrhea. However a detailed and in depth prospective study would be more than useful to enrich the knowledge and would enhance the understanding of disease processes which cause acute or chronic otorrhoea, so that appropriate preventive and curative measures can be undertaken.

KEYWORDS: Otorrhea; Chronic Otitis Media; Microbial flora

INTRODUCTION:

Otorrhea is a common ENT presentation affecting all the age groups which requires accurate assessment. Inflammatory conditions of external and middle ear account for most ear discharges. These include acute and chronic otitis externa, acute otitis media, Chronic Otitis Media with or without cholesteatoma and otomycosis. The 12-month period prevalence of otorrhea in otitis externa in females is 1.3% and males 1.2%¹. Otitis media (OM) is most common in children, and has an incidence of 11.5% among those in their first year of life². Prevalence of CSOM in a study was found to be around 17.2% and 63.8% of mothers were illiterate and 48.5% were with low economic status³.

The etiology of ear discharge is of complex nature, majority being aerobic bacteria, and the rest are anaerobes, fungi and mixed infections. Therefore, the need to determine the cause behind the discharge and to find out the nature and microorganism related to it becomes important.

Both infection and trauma produce ear drainage. There are 5 types of otorrhea: serous, mucoid, purulent, clear and bloody. Most common among these is purulent type. Most common cause of serous, mucoid and purulent otorrhea are the inflammations of the ear and most common cause of bloody and clear otorrhea are injuries of the ear and head⁴.

Red flag signs of otorrhea include: Recent major head trauma, any cranial nerve dysfunction (including sensorineural hearing loss), fever, erythema of ear or periauricular tissue, diabetes or immunodeficiency.

The current study is being conducted to determine the microbial flora in patients presenting with otorrhea and guide towards empirical treatment based on the susceptibility of the safest antimicrobial to the causative organism.

AIMS AND OBJECTIVES:

To determine the microbial profile in a patient presenting with ear discharge.

MATERIAL AND METHODS:

The current study is a prospective observational (descriptive) study which involves a preliminary mycobacterial analysis of the ear discharge in a sample of 95 patients presenting with otorrhea. The study was conducted at the outpatient Department of Otorhinolaryngology in collaboration of the department of microbiology at King George Medical College, Lucknow. The aim was to identify the prevalent microbial profile in our patient population that would in turn guide us in selection of empirical treatment for otorrhea. The study was approved by Institutional Ethical Committee and written informed consent was taken from the patient/guardian. The duration of the study was 4 months, starting from 01-08-2018 till 31-12-

2018. Sample selection hence was determined by the patient's willingness to participate and his/her economic status to undergo the study procedure. All patients were clinically examined and pus as obtained with the help of sterile swab was sent for bacteriological and mycological examination. Culture media used for bacteriology was Blood agar and MacConkey agar wherein the incubation period was 24 hrs. Mycological assessment was performed using SDA (Sabouraud's Dextrose Agar), DTM (Dermatophyte Test Medium), Candida car agar, Corn Meal agar and MGM (Modified Gomori Methenamine Silver) and the sample was incubated for 28 days. Patients were then followed up with their reports and the data was collected and compiled.

Data obtained on demographic variables, clinical parameters, mycobacterial profile and laterality of affected ear was tabulated and analyzed using Microsoft excel software.

The age range of the patients included in this study varied between 1 to 68 years. These presented with ear discharge and were not on any recent systemic or topical antibiotic treatment. Those unwilling to participate in the study or follow-up and those who received a recent course of antibiotic or some sort of ear-surgery were excluded from the study.

RESULTS:

A total of 95 aural swabs were collected from discharging ear of patients belonging to all age groups. Out of which 47 were male (49.47) and 48 females (50.53%).

Age ranged from 1-68 years, with young adult population (20-35 years) being most commonly affected. 44 patients had their right ear affected, 39 left and 12 had bilateral disease. However, in patients with bilateral disease, aural swabs were collected from actively discharging ear only. Total of 86 (90.53%) patients had a positive bacterial or mycological culture and 9 patients (9.47%) had culture as sterile.

Table 1: Age wise prevalence of otorrhea

| AGE GROUP | MALE | | FEMALE | |
|---------------|------|-------|--------|-------|
| | N | % | n | % |
| (1-10 years) | 4 | 4.21 | 5 | 5.26 |
| (11-19 years) | 8 | 8.42 | 10 | 10.52 |
| (20-35 years) | 24 | 26.31 | 19 | 20 |
| (36-55 years) | 10 | 10.52 | 11 | 11.57 |
| (>55 years) | 1 | 1.05 | 3 | 3.16 |

Out of 95 patients, 86 patients (90.52%) in total showed positive culture: 78 patients showed positive bacterial culture, 18 showed positive fungal culture, 11 patients had culture positive for bacteriology and mycology and 9 were sterile.

Most common amongst the bacteria are *pseudomonas aeruginosa* (18.94%) and coagulase negative *staphylococcus aureus* (14.73%). Mycological profile revealed the predominance of *Aspergillus species* (9.47%).

Table 2: BACTERIOLOGY AND MYCOLOGY

| Bacterial culture | n | % |
|--|----------|----------|
| Pseudomonas species | 12 | 12.63 |
| Pseudomonas aeruginosa | 18 | 18.94 |
| Klebsiella pneumoniae | 4 | 4.21 |
| Staphylococcus aureus | 12 | 12.63 |
| Diphtheroid | 5 | 5.26 |
| Proteus mirabilis | 2 | 2.10 |
| Coagulase negative staphylococcus aureus | 14 | 14.73 |
| Acinetobacter baumannii | 2 | 2.10 |
| Enterobacter aerogenes | 1 | 1.05 |
| Fungal culture | n | % |
| Aspergillus | 9 | 9.47 |
| Candida species | 6 | 6.32 |
| Malassezia furfur | 1 | 1.05 |
| Undetermined | 2 | 2.10 |

In terms of the underlying pathology for otorrhea, most common diagnosis was CSOM mucosal (84.21%) followed by CSOM squamous (11.58%). Other less common diagnosis included otomycosis (3.16%) and otitis externa(1.05%).

Table 3: ETIOLOGY OF OTORRHEA AND ITS GENDER DISTRIBUTION

| Diagnosis | N | % | Male | | Female | |
|------------------|----------|----------|-------------|----------|---------------|----------|
| | | | N | % | n | % |
| CSOM mucosal | 80 | 84.21 | 42 | 44.21 | 38 | 40 |
| CSOM Squamous | 11 | 11.58 | 6 | 6.31 | 5 | 5.26 |
| Otomycosis | 3 | 3.16 | 1 | 1.05 | 2 | 2.10 |
| Otitis Externa | 1 | 1.05 | 0 | 0 | 1 | 1.05 |

Table 4: microbial prevalence based on etiology

| ORGANISM | CSOM MUCOSAL | CSOM SQUAMOUS | OTITIS EXTERNA | OTOMYCOSIS |
|-------------------------|-----------------|------------------|-------------------|------------|
| Pseudomonas species | 9 | 3 | - | - |
| Pseudomonas aeruginosa | 14 | 5 | - | - |
| Klebsiella pneumoniae | 4 | - | - | - |
| Staphylococcus aureus | 8 | 2 | 1 | 2 |
| Diphtheroid | 5 | - | - | - |
| Proteus mirabilis | 3 | 1 | - | - |
| CONS | 11 | 3 | - | - |
| Acinetobacter baumannii | 2 | - | - | - |
| Enterobacter aerogenes | 1 | - | - | - |
| Aspergillus | 9 | - | - | - |
| Candida | 4 | 1 | - | - |
| Malassezia furfur | 1 | - | - | - |
| Undetermined | 2 | - | - | - |

DISCUSSION:

The current study was conducted over 95 patients presenting with otorrhea to the ENT OPD. It is a prospective descriptive study designed to find out the current trend of microbial flora in patients presenting with otorrhea. Microbial profile including bacteriology and mycology was studied on these patients presenting with otorrhea due to various pathologies and the causative organism was identified. These were in the form of either bacterial or mycological or mixed flora.

Similar studies have been conducted in the past but mostly pertaining to a single diagnosis of CSOM. The commonest age group affected in the current study is 20-35 years with males commonly affected (26.31%) while in a study by Upasna et al in 2016, it was 10 months- 10 years (30/28.5%), mainly affecting males (59.4%)⁶.

High prevalence of culture-positive cases of CSOM i.e. around 90.5%⁷ and 93.84%⁸ is reported in literature. The current study showed inline results with the studies quoted above, showing high percentage (90.52%) of patients presenting with positive culture findings.

J Bardanis et al in 2003 found that most common cause of purulent otorrhea is chronic otitis media, the results are comparable with the current study. J Bardanis et al also found that most common organism for purulent otorrhea is *pseudomonas aeruginosa*^{5-7,9} followed by *pseudomonas species* and *staphylococcus aureus* and most common mycological culprit being *Aspergillus species*, which is again comparable with the current study⁵. The current study has taken into account the patient's symptom of ear discharge which could be due to any underlying pathology. The implication lies in finding the most common bacteria/fungi causing

otorrhea and designing an empirical treatment/management for the same. However there have been a lot of confounding factors too.

Time has been one of the major constraints due to which a larger sample and a detailed study wasn't possible. Antibiotic sensitivity hasnot been taken into account which would have helped in determining a better treatment protocol. Patients immunology status also needs to be taken into account along with comorbidities if any.

The future beholds a lot of scope for an improved and sophisticated study given that the sample size and duration of study can be further extended.

CONCLUSION:

Changing trends in microbiology of otorrhea has prompted us towards conducting the current study. Since there are regional variations in etiological agents and their antimicrobial susceptibility patterns, it is pertinent to carry out prospective studies to observe the profile of etiological agents. The results of the current study is in concurrence with the other literature available on the microbial flora of otorrhea. *Pseudomonas aeruginosa* is the most common isolate followed by *Staphylococcus aureus* from the culture specimens of otorrhea whereas *Aspergillus* species is the commonest fungal isolate in otorrhea seconded by *Candida* species.

REFERENCES:

1. Rowlands S, Devalia H, Smith C, et al. Otitis externa in UK general practice: a survey using the UK General Practice Research Database. *Br J Gen Pract* 2001; 51(468): 533–538
2. Ross AK, Croft PR, Collins M. Incidence of acute otitis media in infants in a general practice. *J R Coll Gen Pract* 1988; 38(307): 70–72
3. International Journal of Recent Trends in Science And Technology, ISSN 2277-2812 E-ISSN 2249-8109, Volume 16, Issue 3, 2015
4. Gates GA, Avery C, Prehoda JP, Holt GR. Post-tympanostomy otorrhea. *Laryngoscope* 1986;96:630-4
5. J Bardanis, Batakis D, Mamatas S. Types and causes of otorrhea. *Auris Nasus Larynx* 30 (2003);253-257
6. Bhumbra U, Gupta P, Mathur DR, et al. Current trends in microbial profile and resistance pattern in CSOM in a semiurban hospital of Southern India. *J. Evolution Med. Dent. Sci.* 2016;5(34):1917-1921,
7. Dr R. Sudhakar, Dr. P. Appa Rao and Dr. G. Raja Prameela. Altering Microbiological Frequency in Chronic Suppurative Otitis Media Patients. *Int J Res Health Sci* 2015; 3(4): 493-497.
8. GoyalP, Mishra RK, Singhal A . Microbial profile with their antimicrobial susceptibility pattern in ear discharge of CSOM patients at a tertiary care hospital in Northern Rajasthan. *Int J Res Health Sci* August 2018;4(8):152-156.
9. Bansal Sulabh et al. Changing microbiological trends in cases of chronic suppurative otitis media patients. *Int J Cur Res RevAug* 2013;05(15):76-81.