TO STUDY THE INFECTIVE PROFILE OF PATIENTS WITH EAR INFECTIONS IN TERTIARY CARE HOSPITAL BIHAR: AN OBSERVATIONAL STUDY.

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Abstract

Aim: to study the infective profile of patients with ear infections.

Materials and Methods: The present prospective observational study was conducted in the Department of ENT, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India. Among 200 patients attended the OPD of the ENT presented with ear infection/discharge. Aural discharge samples collected through a sterile culture sensitivity tube and sent to microbiological lab and culture sensitivity reports collected from the patients during follow up visits.

Results: majority of participants were in the age group between 1 and 20 years. 60.5% of the patients had ear discharge for ≥ 14 days. The prevalence of ear infection among females (53.5%) was slightly higher than males (46.5%). Gram negative organisms are detected in (47.0%), Gram positive organisms detected (34.5%), fungal infection detected (6.0%) and no organism detected (12.5%) of the aural swab samples.

Conclusion: The profile and predominant bacteria isolated highlights the need for continuous surveillance and reporting of the microbiology of ear infection in our local community in order to guide clinicians use the appropriate antimicrobials towards the incriminated etiologies.

Keywords: culture, sensitivity, ear infection

Introduction

Infection of the ear is a common health problem in both children and adults worldwide.¹ This accounts for a major health and economic problems, especially in the developing countries where resources for diagnosis and treatments are limited.²

Ear infection can be classified in different ways depending on the duration of illness, and the type of clinical manifestation the patient is having or otoscopic findings.³ It can be acute or chronic and includes otitis externa (OE) which is an infection of the external auditory canal and otitis media (OM) which is an infection of the middle ear.⁴ An ear infection affects about 65–330 million people worldwide, and about 60% of them suffer from significant hearing loss.⁵

Although ear infection can be a self-limiting, if left untreated, it can cause serious complications such as recurrent acute otitis media, persistence of middle ear effusion, hearing impairment, mastoiditis, meningitis, chronic otitis media, brain abscess and sepsis.

The most common bacteria isolated in several studies were as follows: *P. aeruginosa*, *S. aureus*, and *P. mirabilis*.⁶⁻⁸ One study from Hail University showed that *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, *S. aureus*, and *Streptococcus pyogenes* are the

most common organisms associated with acute otitis media and could occur after an episode of viral upper respiratory tract infection.⁹ Although most of these organisms are sensitive to most common antimicrobial agents used, resistance of bacterial isolates to these agents becomes an alarming global health problem.¹⁰

Early, prompt and effective treatment of ear infection will significantly reduce both short and long term complications associated with ear infection and can also improve the quality of life of patients with ear infection. Thus, having up-to-date information on the etiologies responsible for ear infection and their antimicrobial susceptibility pattern is crucial. Hence the present study was conducted with the aim to study the infective profile of patients with ear infections in tertiary care Hospital Bihar.

Materials and methods

Study Design

The present prospective observational study was conducted in the Department of ENT, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India. Among 200 patients attended the OPD of the ENT presented with ear infection/discharge.

The study protocol was reviewed by the Ethical Committee of the Hospital and granted ethical clearance. After

explaining the purpose and details of the study, a written informed consent was obtained.

Inclusion Criteria

- Patients of any age group and either sex
- Patients presented with ear infection/discharge
- Patients with outer ear defects such as complete stenosis or atresia of external auditory canal
- Patients who has signed the informed consent

Exclusion criteria

- Patients who has not signed the informed consent
- Patients having any kind of acute and chronic systemic illness

Sample selection

The sample size was calculated using a prior type of power analysis by G* Power Software Version 3.0.1.0 (Franz Faul, Universitat Kiel, Germany). The minimum sample size was calculated, following these input conditions: power of 0.80 and $P \leq 0.05$ and sample size arrived were 180 participants.

Methodology

Detailed history obtained from study participants regarding ear discharge, unilateral or bilateral involvement, duration of ear discharge, ear discharge, earache, decreased hearing, tinnitus, hearing loss, previous surgical procedures. Clinical examination of patient is done including general physical examination and systemic examination for assessing the general condition of participants. A thorough ENT examination is done including ear examination, throat examination, nasal examination. Aural discharge samples collected through a sterile culture sensitivity tube and sent to microbiological lab and culture sensitivity reports collected from the patients during follow up visits.

Statistical analysis

The data was entered in the form of a data matrix in Microsoft Excel® and analysed statistically using IBM® SPSS® version 20.0.0. Descriptive statistics were calculated as frequencies for categorical variables and means and standard deviation for continuous variables.

Results

Table 1: demographic profile of the study population

Gender	N (%)
Female	107 (53.5%)
Male	93 (46.5%)
Age (Years)	
1-10	71 (35.5%)
11-20	52 (26.0%)
21-30	39 (19.5%)
>30	38 (19.0%)
Age (Mean $\pm$ SD)	21.16 $\pm$ 3.61

Table 2: distribution of laterality of the ear involved

Laterality	N (%)
Right	87 (43.5.0%)
Left	63 (31.5.0%)
Bilateral	50 (25.0%)
Total	200 (100.0%)

Table 3: distribution of duration and type of ear discharge

Duration of discharge	N (%)
< 14 days	79 (39.5.0%)
≥ 14 days	121 (60.5.0%)
Total	200 (100.0%)
Type of discharge	
Watery	48 (24.0%)
Purulent	84 (42.0%)
Mucoid	44 (22.0%)
Blood stained	24 (12.0%)

Table 4: distribution of infective organisms

Infective organisms	N (%)
Gram Negative (Pseudomonas aeruginosa, Klebsiella pneumonia etc.)	94 (47.0%)
Gram Positive (Staphylococcus aureus, Staphylococcus epidermidis etc.)	69 (34.5%)
Fungal	12 (6.0%)
No Growth detected	25 (12.5%)
Total	200 (100.0%)

Discussion

In our study, the majority of participants were in the age group between 1 and 20 years. This might be because children are exposed to more crowded areas such as daycares and exposed to other infected children which is also associated with poor hygiene and aerosol spread of respiratory infections that ascend to the middle ear.¹¹ In addition, physiologically children have a shorter and more horizontal Eustachian tube, compared to older individuals, which is associated with easier reflux of nasopharyngeal secretions.¹

In this study, the majority of the patients (60.5%) had ear discharge for ≥ 14 days, which is in agreement with previously done studies.^{2,12-14} The results also showed that the prevalence of ear infection among females (53.5%) was slightly higher than males (46.5%), Alenezi *et al.*¹⁵ and Klein¹⁶ also found similar results, but there is no clear explanation whether there is a gender predilection in ear infections

In the present study Gram negative organisms are detected in forty-four (47.0%), Gram positive organisms detected (34.5%), fungal infection detected (6.0%) and no organism detected (12.5%) of the aural swab samples this was found in agreement with previous studies. This is in agreement with previous studies done in Ethiopia,^{13,17}

Nigeria,^{18,19} South Korea,²⁰ Greece,²¹ Pakistan,²² Turkey²³ and Eastern Nepal.²⁴

The limitations of this study include the fact that we did not include the OME and OM without discharge. Our study didn't intend to differentiate OM from otitis externa. Another limitation Isolated organisms were not tested for sensitivity and resistance patterns. Furthermore, this study gives data about this hospital only and does not provide regional data.

Conclusion

The present study concluded that, ear infection is a major health problem in developing countries and *Staphylococcus aureus* was the commonest infective organism detected. The profile and predominant bacteria isolated highlights the need for continuous surveillance and reporting of the microbiology of ear infection in our local community in order to guide clinicians use the appropriate antimicrobials towards the incriminated etiologies.

References

1. Bluestone CD, Klein JO. Otitis Media in Infants and Children. 4th ed. Hamilton, Ontario, Canada: BC Decker, Inc.; 2007.
2. Wasihun AG, Zemene Y. Bacterial profile and antimicrobial susceptibility patterns of otitis media in ayder teaching and referral hospital, Mekelle University, Northern Ethiopia. Springerplus 2015;4:701.
3. Bervnan, S., Classification and criteria of otitis media. Clinical Microbiology and Infection, 1997. 3: p. 351-354.
4. Doherty G, Way L. Current Diagnosis and Treatment Surgery. 14th ed. New York: Lange Medical Books/McGraw- Hill Companies, Inc.; 2015. p. 2445.
5. Woodfield G, Dugdale A. Evidence behind the WHO guidelines: Hospital care for children: What is the most effective antibiotic regime for chronic suppurative otitis media in children? J Trop Pediatr 2008;54:151-6.
6. Al Mazrou KA, Shibl AM, Kandeil W, Pirçon JY, Marano C. A prospective, observational, epidemiological evaluation of the aetiology and antimicrobial susceptibility of acute otitis media in Saudi children younger than 5 years of age. J Epidemiol Glob Health 2014;4:231-8.
7. Attallah MS. Microbiology of chronic suppurative otitis media with cholesteatoma. Saudi Med J 2000;21:924-7.
8. Ahmad S. Chronic suppurative otitis media due to *Staphylococcus aureus* in Saudi Arabia. Phys Acad 2017;11:53-7.
9. Fouda SI, Kadry AA, Shibl AM. Beta-lactam and macrolide resistance and serotype distribution among *Streptococcus pneumoniae* isolates from Saudi Arabia. J Chemother 2004;16:517-23.
10. Vishwanath S, Mukhopadhyay C, Prakash R, Pillai S, Pujary K, Pujary P, et al. Chronic suppurative otitis media: Optimizing initial antibiotic therapy in a tertiary care setup. Indian J Otolaryngol Head Neck Surg 2012;64:285-9.
11. Wiertsema SP, Leach AJ. Theories of otitis media pathogenesis, with a focus on indigenous children. Med J Aust 2009;191:S50-4.
12. Seid A, Deribe F, Ali K, GKibru G. Bacterial otitis media in all age group of patients seen at Dessie referral hospital, north East Ethiopia. EJENTAS. 2013;14(2):73-8.
13. Tessema G. Otitis media seen in Yekatit 12 hospital. Ethiop Med J. 2001; 39(2):113-21.
14. Muleta D, Gebre-Selassie S. Isolation and antimicrobial susceptibility patterns of bacterial pathogens causing otitis media in children in Jimma Hospital, Southwestern Ethiopia. Ethiop J Health Sci. 2004;14(2):89-9.
15. Alenezi NG, Alenazi AA, Elboraei YA, Alenazi AA, Alanazi TH, Alruwaili AK, et al. Ear diseases and factors associated with ear infections among the elderly attending hospital in Arar city, Northern Saudi Arabia. Electron Physician 2017;9:5304-9.
16. Klein JO. Otitis media. Clin Infect Dis 1994;19:823-33.
17. Melaku A, Lulseged S. Chronic suppurative otitis media in a children's hospital in Addis Ababa, Ethiopia. Ethiop Med J. 1999;37:237-45.
18. Tobih JE, Taiwo SS, Olowe OA, Olausun OA, Adejumo SD. Clinical and microbiological profiles of ear infections in Osogbo, Nigeria. Trop Doct. 2006;36:165-66.
19. Wariso BA, Ibe SN. Bacteriology of chronic discharging ears in Port Harcourt, Nigeria. West Afr J Med. 2006;25:219-22.
20. Yeo SG, Park DC, Hong SM, Cha CI, Kim MG. Bacteriology of chronic suppurative otitis media – a multicenter study. Acta Otolaryngol. 2007;8:1-6.
21. Bardanis J, Batzakakis D, Mamatas S. Types and causes of otorrhea. Auris Nasus Larynx. 2003;30:253-57.
22. Aslam MA, Ahmed Z, Azim R. Microbiology and drug sensitivity patterns of chronic suppurative otitis media. J Coll Physicians Surg Pak. 2004;14:459-61.
23. Gu" I HC, Kurnaz A, Turhan V, Oncu" I O, Pahsa A. Microorganisms isolated from middle ear cultures and their antibacterial susceptibility in patients with chronic suppurative otitis media. Kulak Burun Bogaz Ihtis Derg. 2006;16:164-8.
24. Sharma S, Rehan HS, Goyal A, Jha AK, Upadhyaya S, Mishra SC. Bacteriological profile in chronic suppurative otitis media in Eastern Nepal. Trop Doct. 2004;34:102-4.