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BACTERIOLOGY OF EAR DISCHARGE IN SUPPURATIVE OTITIS MEDIA IN A TERTIARY CENTRE OF NEPAL

ABSTRACT

Objective:
To find out the various bacteria causing suppurative otitis media and to assess their sensitivity pattern to different commonly used antibiotics.

Materials and Methods:
This is a prospective study conducted from June 2013 to May 2015 in Bir Hospital. 129 patients were selected for the study. Ear discharge samples were collected and sent to the laboratory using standard technique. The culture and sensitivity reports were then analyzed.

Results:
Majority of the patients were from 21 to 30 years of age group. 89.9% of ear swabs grew bacteria. 72.9% of bacterial isolates were monomicrobial and 17.1% were polymicrobial. The most common bacterial isolate was Staphylococcus aureus followed by Pseudomonas aeruginosa. Cephalexin and Ceftriaxone were found to be the most sensitive antibiotic.

Conclusion:
Antibiotics should be selected carefully taking into consideration the bacteriology in the area when treating suppurative otitis media.

Keywords: Bacteriology, Culture Sensitivity, Suppurative Otitis Media

INTRODUCTION

Suppurative Otitis Media which could be either acute or chronic is a common clinical problem faced by Otolaryngologists. It is the inflammation of the middle ear cleft with discharge of pus from the ear. This disease mainly affects people living in underdeveloped nations, especially in rural areas where socioeconomic conditions, health awareness and personal hygiene is poor. It has been estimated that about 65– 330 million people suffer from ear infection worldwide and 60% of them had significant hearing impairment.[1] The discharging ear is a common problem in the tropics. It is seen in all age groups but is more prevalent in infants and children.[2] The economic burden of ear infection is also high especially in Africa and other developing nations where the disease prevalence is estimated as high as 11%.[3] The Eustachian tube of a child is shorter, more horizontal with a more flaccid cartilage which can easily impair its opening thus making suppurative ear disease more common in children.[4] The etiology and prevalence of suppurative ear disease is different in different geographical region.[5,6] According to World Health Organization (WHO) survey, countries can be divided into those having low ear infection with a prevalence rate of ear infection among children between 1-2% and high when it is 3–6% and Nepal belongs to latter category.[7] The major cause of ear infection leading to discharge is bacterias such as Staphylococcus aureus, Proteus mirabilis, Pseudomonas aeruginosa, Klebsiella pneumonia and Escherichia coli although sometimes it can also be caused by viruses and fungi.[8,9] Bacterial predominance and their antibiotic sensitivity pattern may change over time. Therefore, it is important to know the local pattern of infection to get an effective outcome for the treatment of this disease.

MATERIALS AND METHODS:

This is a prospective study donefrom June 2013 to May 2015 in Bir Hospital The following criteria were considered in selecting the patients for this study.

- Patients with purulent aural discharge due to suppurative otitis media at the time of examination.
- Patients not taking antibiotics for the last seven days.

Patients of any age and gender with discharging ear falling under above criteria were included. Aural swabs were collected from patients after cleaning external auditory canal with spirit swab. Pus swabs were cultured on blood agar, MacConkey agar and chocolate agar. Swabs were procured for the isolation of aerobic bacteria using standard

bacteriological procedures and the organisms grown were identified according to the standard bacteriological methods.[10]

All cases showing growth on culture media after 72 hours of inoculation were subjected to antibiotic sensitivity testing by modified Kirby -Baver disk diffusion method and interpreted using standard guidelines.[11]

RESULTS

A total of 129 patients were included in this study. There were 57 males and 72 females with a male to female ratio of 1:1.26

Majority of the patients in this study were between 21–30 years (46%) followed by 11– 20 years (35%), 31–40 years (9%) [Table 1]. Right ear was affected in 42% cases, left ear in 52% and there was bilateral involvement in 6% cases.

Table 1. Age and Sex distribution

Age (years)	Male	Female	Right ear	Left ear	Both ear	Total
11 – 20	24	21	22	20	3	45
21 – 30	24	36	23	33	4	60
31 – 40	5	7	5	6	1	12
41 – 50	3	6	3	6	0	9
> 50	1	2	1	2	0	3
Total	57	72	54	67	8	129

Of the 129 patients, positive cultures were obtained in 116 cases. Ninety-four patients (81%) had single organism isolated from the ear discharge swab while twenty-two (19%) had two organisms isolated. Thirteen patients had a sterile culture with no growth.

The most common bacterial isolate was Staphylococcus aureus followed by Pseudomonas aeruginosa, Coagulase negative Staphylococcus, Klebsiella sp., Proteus sp. and Escherichia coli.

Table 2. Bacteria isolated from ear discharge.

Bacteria isolated	No. of cases	Percentage
Staphylococcus aureus	43	28.5 %
Pseudomonas aeruginosa	37	24.5 %
Coagulase negative Staphylococcus	25	16.6 %
Klebsiella sp	19	12.6 %
Proteus sp	7	4.6 %
Escherichia coli	4	2.6 %
No growth	13	10.1 %

The antibiotic sensitivity testing showed that 96% of isolates were sensitive to Cephalexin and Ceftriaxone and only 4% were resistant. Similarly Amoxyclav was found to be sensitive in 90% of isolates followed by Amoxycillin in 76%, Erythromycin in 74%, Ciprofloxacin in 70% and Cotrimoxazole in 62%. The ratio of resistance was 38% to Cotrimoxazole, 30% to Ciprofloxacin, 26% to Erythromycin and 24% to Amoxicillin.

Table 3. Antibiotic Sensitivity listing

Antibiotics	Percent of Sensitive	Isolates Resistant
Cephalexin	96%	4%
Ceftriaxone	96%	4%
Amoxyclav	90%	10%
Amoxicillin	76%	24%
Erythromycin	74%	26%
Ciprofloxacin	70%	30%
Cotrimaxazole	62%	38%

DISCUSSION

Suppurative otitis media is a common problem and frequently leads to complications if not treated properly and timely. Various studies have been conducted to identify causative bacteria but the results are far from consistent. In this study, 89.9% cases of ear discharges were found to be positive for bacteria which are in agreement with the study done by Abera B et al in Ethiopia.9 In our study, the majority of the patients belonged to the age group 21-30 years (46.5%) which is consistent with the findings of Loy et al[12] and Srivastava et al[13]. There was an almost equal male to female ratio (M: F=1:1:26). A similar conclusion was made by Loy et al.[12] The bacteria isolates of discharging ear in our study was polymicrobial in 17.1% cases and monomicrobial in 72.9% cases which correlates with the study by Raakhee et al.[14] Our study showed Staphylococcus aureus to be the most common bacteria isolated (28.5%) followed by Pseudomonas aeruginosa (24.5%). This is in contrast to the study by Sharma et al[15] who reported Pseudomonas (36%) to be the most common bacteria isolated followed by Staphylococcus aureus (30%). Similarly, Raakhee et al[14] also found Pseudomonas aeruginosa (34.21%) to be the most common bacteria isolated followed by Staphylococcus aureus (27.63%). The antibiotic sensitivity pattern showed Cephalexin and Ceftriaxone to be most effective. 96% of the isolates were sensitive to Cephalexin and Ceftriaxone, 90% to Amoxyclav, 76% to Amoxycillin, 74% to Erythromycin, 70% to Ciprofloxacin and 62% to Cotrimoxazole. Raakhee

et al found pseudomonas to be highly sensitive to Ciprofloxacin (92.3%). Gentamicin (84.61%), Imipenem (84.61%), Pipercillin 88.46%).[14] Raakhee et al also found Staphylococcus aureus to be sensitive to Gentamicin(90.47%), Clindamycin(85.7%), Cephalexin (85.7%) and Ofloxacin (71.42%).

CONCLUSION

Our present study and other similar studies indicate that there can be significant variation in the type of bacteria causing suppurative ear disease and their antibiotic sensitivity pattern. In our study,Staphylococcus aureus and Pseudomonas aeruginosawere the most common bacteria associated with ear discharge. Appropriate antibiotics should be prescribed after proper identification of causative bacteria and its antibiotic sensitivity pattern. The most sensitive drugs to the bacterial isolates in this study were Cephalexin and Ceftriaxone. Other sensitive drugs were Amoxyclav, Amoxicillin and Erythromycin. Keeping in view the cost of Cephalosporin group of drugs, Amoxyclav, Amoxicillin and Erythromycin would be an effective and cheap drug to start treatment for cases of suppurative ear disease. Cephalosporin group of drugs can be reserved for resistant cases or cases presenting with complications. Finally, the antibiotic sensitivity pattern must be continuously and periodically evaluated to decrease the risk of resistant strains.

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