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MICROBIOLOGICAL PROFILE OF CHRONIC SUPPURATIVE OTITIS MEDIA

Objective:

To observe the frequency of different micro-organisms of Chronic suppurative otitis media (CSOM).

Materials and Methods:

This was the prospective, randomized and longitudinal study performed in two hundred and thirty patients of chronic suppurative otitis media with unilateral or bilateral ear discharge attending the out patient department of ENT-HNS in Kathmandu University hospital, Dhulikhel, Nepal from 1st January 2010 to 1st July 2010. Patient of any age, both gender and ear discharge of more than 3 months duration was included. Whereas discharge of less than 3 months duration, discharge with intact tympanic membrane (otitis externa) and patient receiving antibiotics at presentation were excluded. Sterile cotton bud was used to collect pus swabs to harvest the middle ear micro flora through the tympanic membrane perforation via aural speculum. The pus swabs were cultured on blood, chocolate and MacConkey's agar and incubated at 37°C for 24-48 hours. Any fungi that were isolated were sub cultured onto Sabouraud's dextrose agar to identify fungal species. All organisms isolated were identified according to standard microbiological methods. The data were analyzed with simple manual analysis using percentage and frequency.

Results:

There were total 230 patients included in the study. The age range was from 6 to 58 years with mean age of 33 years and most of the patients were of age group between 21-30 years. There were total 127 females and 103 male with ratio of 1.23:1. The right ear was involved in 114 cases and left ear in 102 cases. The most common microorganisms isolated were staphylococcus aureus 74(32.2%) and pseudomonas aeruginosa 62(26.9%).

Conclusion:

Because of the variation in climate, community, patient population and inadvertent use of antibiotics, the pattern of microbiological flora vary in chronic suppurative otitis media. So, it is very useful and helpful to identify the micro-organisms as it gives us the clue regarding the use of appropriate antibiotics.

Key words: chronic suppurative otitis media, pseudomonas aeruginosa, staphylococcus aureus, tympanic membrane.

INTRODUCTION:

Chronic suppurative otitis media (CSOM) is defined as persistent or intermittent infected discharge of more than three months duration through the perforated or non intact tympanic membrane caused by bacteria, fungi and virus resulting in inflammation of mucosal lining that often results in partial or total loss of the tympanic membrane (TM) and ossicles.¹ This disease is common in all age groups but prevalent mainly in childhood belonging to lower socioeconomic group. It is most commonly seen in developing and undeveloped countries affecting 0.5–30% of any community. The prevalence of CSOM is 3.5% in Nepal.² Chronic suppurative otitis media has profound impact on society in terms of hearing of patient.³ It causes conductive and sensorineural hearing loss and adverse effects on child development.⁴ Most common micro-organisms found in CSOM are Pseudomonas aeruginosa, Staphylococcus aureus, Proteus mirabilis, Klebsiella pneumoniae, Escherichia coli, Aspergillus spp and Candida spp but these organisms vary in various geographical areas.⁵ The bacteria are uncommon in the skin of the external canal, but in the presence of trauma, inflammation, lacerations or high humidity may proliferate.⁶ These bacteria may then gain entry to the middle ear through a chronic perforation.⁷ The main aim of this study is to observe the frequency of different micro-organisms of CSOM.

MATERIALS AND METHODS:

This is the prospective, randomized and longitudinal study performed in the out patient department of ENT in Kathmandu University hospital, Dhulikhel, Nepal from 1st January 2010 to 1st July 2010. Two hundred and thirty patients of chronic suppurative otitis media with unilateral or bilateral ear discharge were enrolled. Detailed clinical history regarding age, sex, duration of discharge and antibiotic therapy were taken. Patient of any age, both gender and ear discharge of more than 3 months duration was included. Whereas discharge of less than 3 months duration, discharge with intact tympanic membrane (otitis externa) and patient receiving antibiotics at presentation were excluded. For the purpose of collecting pus swab, we used the sterile cotton bud to collect pus swabs to harvest the middle ear micro flora through the tympanic membrane perforation via aural speculum. We had taken the utmost care to avoid surface contamination and the swabs were transported to microbiology section of pathology laboratory for further processing. The pus swabs were cultured on blood, chocolate and Mac Conkey's agar and incubated at 37°C for 24-48 hours. Any fungi isolated were sub cultured onto Sabouraud's dextrose agar to identify fungal species.

All organisms isolated were identified according to standard microbiological methods.⁸ The data were analyzed with simple manual analysis using percentage and frequency with MS Excel software 2007.

RESULTS:

There were total 230 patients included in the study. The age range was from 6 to 58 years with mean age of 33 years and most of the patients were of age group <10 years and between 11-20 years as shown in table 1. There were total 127 females and 103 male with ratio of 1.23:1 as shown in table 2. The right ear was involved in 114 cases and left ear in 102 cases as shown in table 3. The types of microorganisms distribution is shown in table 4.

Table 1: Age distribution of patients (n=230)

Age	Number (%)
<10 years	80(34.8%)
11-20 years	70(30.4%)
21-30 years	43(18.7%)
31-40 years	22(9.6%)
41-50 years	11(4.8%)
>50 years	4(1.7%)

Table 2: Sex distribution of patients (n=230)

Sex	Number (%)
Male	103(44.8%)
Female	127(55.2%)

Table 3: Site distribution. (n=230)

Site	Number (%)
Right ear	114(49.6%)
Left ear	102(44.3%)
Bilateral ear	7(6.1%)

Table 4: Microbiology profile of CSOM. (n=230)

Types of organisms	Number of isolates (%)
Gram +ve bacteria	
Staphylococcus aureus	74(32.2%)
Streptococcus pneumoniae	14(6.1%)
Gram -ve bacteria	
Pseudomonas aeruginosa	62(26.9%)
Klebsiella spp.	24(10.4%)
Proteus mirabilis	16(6.9%)
E. coli	16(6.9%)
Fungus	
Aspergillus spp.	16(6.9%)
Candida spp.	6(2.6%)
Normal flora	
	2(0.8%)

DISCUSSION:

Chronic suppurative otitis media is the most common ear disease which is encountered in our day to day clinical practice. This disease is notorious for causing irreversible local destruction of middle ear structures and also the dreadful intracranial complications. Identification of microbiological organisms is important for prescribing appropriate treatment as a wide range of organisms both aerobic and anaerobics are isolated in chronic suppurative otitis media. In our study, CSOM was most prevalent in the age group of children and young adult similar to study performed by Mansoor et al,⁹ Wariso et al¹⁰ and poorey et al.¹¹ There are multiple reasons behind this, like the eustachian tube is short and wider in children and infants. Also in our community, mother breast feeds her child in supine position and they used to instill oil in the ear as traditional belief. But it differs from the study performed by Loy et al¹² which showed the prevalence of disease among age group of 31-40 years. In our study, females were more commonly affected than males as that of study performed by Loy et al¹² and Mansoor et al⁹ but differs from the study performed by Ahmad et al¹³ which showed male 57.3% and female 42.7%, the difference in results may be due to geographical reason. Since the proportion of different organisms isolated vary from study to study, like in our study the most common bacterial isolate was staphylococcal aureus (32.2%) followed by pseudomonas aeruginosa (26.9%) which is similar to the study performed by Loy et al¹², Taj et al¹⁴ and Ahmed et al,¹⁵ but contrast with other studies which reported Pseudomonas aeruginosa as the major causative organisms.^{9,13,16-18} This variation in results could be due to effect of climate and variation of organisms in different community and locality. Similarly, our study also showed fungal isolates of 9.5% like study carried by Mirza et al,¹⁹ which showed fungal isolates of 11%. This could be due to frequent instillation of oil in ear canal as the traditional medicine in community. If we ignore the minor difference between isolates of staphylococcal aureus and pseudomonas aeruginosa, these two organisms account for 75-85% of total bacterial isolates in cases of CSOM similar to that of other studies.^{13-15,20} Review of literature of bacterial flora in cases of CSOM in different state of India reported pseudomonas aeruginosa as the main isolate in two studies, whereas isolation rate of Staphylococcus aureus in one of the study was quite low and other gram negative rods like Klebsiella pneumoniae, Proteus mirabilis and Escherichia coli was relatively high.^{11,21} These study differ from our study as in our study Klebsiella isolation was 10.4%, Proteus mirabilis 6.9% and E. coli 6.9%. This kind of gram negative isolates in our study could be because of fecal contaminated water where people bath. The microbiological cultures showed many, frequently multiple organisms and these vary depending on climate, patient population and on the use of antibiotics. Because of these factors there is wide variation in different studies.²² However, the isolation of microorganisms is very helpful for the treatment of the CSOM.

CONCLUSION:

Because of the variation in climate, community, patient population and inadvertent use of antibiotics, the pattern of microbiological flora vary in chronic suppurative otitis media. So, it is very useful and helpful to identify the micro-organisms as it gives us the clue regarding the use of appropriate antibiotics.

REFERENCES:

- WHO/ CIBA foundation workshop. Prevention of hearing impairment from chronic otitis media-London: 19-21 Nov 1996. Geneva: World health organization, 1998.
- Adhikari P, Sinha BK, Pokhrel NR, Kharel B, Aryal R, Ma J. Prevalence of chronic suppurative otitis media in school children of kathmandu district. Journal of institute of medicine 2007;29(3):10-12.
- Alan E, Dugdale. Management of chronic suppurative otitis media. Med J Aust 2004; 180(2): 91-93.
- El-sayed Y. Bone conduction impairment in uncomplicated CSOM. Am J Otolaryngol 1998; 19: 149-53.
- Anwar-us-Salam, Abid SH, Abdulla EM. Suppurative Otitis in Karachi: An Audit of 510 Cases. Pak J Otolaryn 1997;13:66-9.
- Mawson S, Pollack M. Special role of Pseudomonas aeruginosa in chronic suppurative otitis media. Ann Otol Rhinol Laryngol Head and Neck Surg., 1988;97 (Suppl. 130):10-13.
- Kenna M. Etiology and pathogenesis of chronic suppurative otitis media. Arch Otolaryngol Head Neck Surg., 1988; 97 (2) (Suppl. 137): 16-17.
- Duiguilid JP, Collee JG, Fraser AG. Laboratory strategy in the diagnosis of infective syndromes. In Collee JG, Marmion BP, Fraser AG, Simmons A. Mackie and McCartney practical medical microbiology. 14th ed. London: 1996.
- 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(2):120-23.
- Wariso BA, Ibe SN. Bacteriology of chronic discharging ears in Port Harcourt, Nigeria. West Afr J Med 2006;25:219-22.
- Poorey VK and Lyer A. Study of bacterial flora in CSOM and its clinical significance. Indian J Otolaryngol Head Neck Surg 2002;54:91-5.
- Loy AHC, Tan AL, Lu PKS. Microbiology of chronic suppurative otitis media in Singapore. Singapore Med J 2002;43:296-9.
- Ahmed A, Usman J, Hashim R. Isolates from chronic suppurative otitis media and their antimicrobial sensitivity. Pak Armed Forces Med J 1999;49:82-5.
- Taj Y, Essa F, Kazmi SU. Pathological analysis of 596 cases of chronic suppurative otitis media in Karachi. J Coll Physicians Surg Pak. 2000;10: 33-5.
- Ahmed B, Hydri AS, Afridi, AAK, Ejaz A, Farooq S, Zaidi SK. Microbiology of ear discharge in Quetta. J Coll Physicians Surg Pak 2005;15:583-4.
- Iqbal SM, Udaipurwala IH, Hasan A, Shafiq M, Mughal S. Chronic suppurative otitis media: Disease pattern and drug sensitivity. J Surg Pak 2006;11:17-9.
- Sharma S, Rehan HS, Goyal A, Jha AK, Upadhyaya S and Mishra SC. Bacteriological profile in chronic suppurative otitis media in Eastern Nepal. Trop 2004;34:102-4.
- Yeo SG, Park DC, Hong SM, Cha CI, Kim MG. Bacteriology of chronic suppurative otitis media-a multicentre study. Acta Otolaryngol 2007;127:1062-67.
- Mirza IA, Ali L, Arshad M. Microbiology of chronic suppurative otitis media-Experience at Bahawalpur. Pak Armed Forces Med J 2008; 4: 82-5.
- Aslam MA, Ahmed Z, Azim R. Microbiology and drug sensitivity patterns of chronic suppurative otitis media. J Coll Physicians Surg Pak 2004; 14; 8: 459-61.
- Hivemath SL, Kanta RC, Yeshwanthrao M, Vasantha kumar CM. Aerobic bacterial isolates of CSOM and their antibiotic sensitivity pattern. Ind Pract 2001;54(7): 486-89.
- Kelly G. Aetiology and epidemiology of chronic otitis media. In: Scott-Brown's Otorhinolaryngology, 7th ed. London, Hodder-Arnold, 2008: 3408 -3410.