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Assessment Of Bacteriological Profile And Antibiotic Susceptibility Pattern In Patients With Chronic Suppurative Otitis Media

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Background: One of the most prevalent viral children illnesses in the world, chronic suppurative otitis media (CSOM) is a major factor in hearing loss in settings with minimal resources. In environments with plenty of resources, it is less common. Chronic middle ear drainage linked to tympanic membrane (TM) perforation is its defining feature. Acute otitis media frequently occurs prior to CSOM (AOM). The long-term consequences of COM-related hearing loss on language development, communication, and the educational process make it a serious concern. It is estimated that developing nations account for two thirds of the global population with hearing impairments. The present study was intended to assess the surgical outcomes in patients with chronic suppurative otitis media who has undergone surgery at our tertiary care hospital.

Methodology: A thorough clinical history was acquired, encompassing age, gender, length of discharge, and prior use of antibiotics. The information was gathered from the patients' medical records as well as during the session. An examination using otoscopy and microscopy was conducted, and then aural toileting. The type of ear discharge, the size and location of the tympanic membrane perforation, and the condition of the middle ear were all noted. Under aseptic conditions, a sample of middle ear discharge was taken from the perforated tympanic membrane area using an otomicroscope, a sterile aluminum stick, and an applicator with a cotton wool tip measuring 1.5 mm in diameter. After being gathered, the specimen was submitted to the microbiology lab for examination and put in Amies transport media.

Results: The present study included a total of 60 patients aged between 1 years to 50 years based on inclusion and exclusion criteria who presented with CSOM. Out of the 60 patients enrolled 29 were males and 31 were females. Majority of the patients were in the age group 1-10 years.[Table 1] Table 2 presents the clinical presentation of CSOM patients, it is seen that 63.33% had unilateral, 20% had right sided and 16.66% had left sided CSOM. The precipitating factors for CSOM included upper respiratory tract infections, allergic rhinitis and no precipitating factors in 50%, 23.33% and 26.66% respectively. Hearing loss, pain, itchiness were the associated symptoms seen in 53.33%, 10% and 26.66% respectively. Mucoid, mucopurulent, purulent discharge was seen 20%, 40% and 40% respectively. 6.66% had foul smelling discharge and 93.33% had non-foul smelling discharge. Table 3 presents microbiological profile in CSOM patients. It is seen that 31.66% had gram positive bacteria, 48.29% had gram negative bacteria and 13.32% had fungal organisms. The most common organism isolated was pseudomonas aeruginosa followed by staph aureus. Antibiotic susceptibility pattern for gram positive bacteria was studied as presented in table 4. It is seen that 100% susceptibility for staph aureus was seen for Rifampin and 100% susceptibility for strep spp was seen for erythromycin and clindamycin.

Conclusion: The bacteriological profile of CSOM showed a high prevalence of P aeruginosa, followed by S aureus. It is seen that 100% susceptibility for staph aureus was seen for Rifampin and 100% susceptibility for strep spp was seen for erythromycin and clindamycin. We observed a declining pattern of their antibiotic sensitivity. It is important to be aware of the current trend of the

bacteriological profiles and to revise the antibiotic regime according to both the sensitivity and age groups.

Keywords: chronic suppurative otitis media, bacteriological profile, antibiotic susceptibility pattern, gram positive bacteria and gram negative bacteria.

Introduction

Chronic suppurative otitis media (CSOM) is defined by the World Health Organization as ear discharge through a ruptured tympanic membrane that lasts longer than 12 weeks [1]. It is distinguished by a persistent deformity of the pars tensa or flaccida, which is followed by a chronic inflammation of the middle ear and mastoid cavity. Pus discharge is caused by varying degrees of edema, submucosal fibrosis and hypervascularity, and lymphocyte, plasma cell, and histiocyte infiltration [2]. According to a research conducted in Malaysia, 2% of school-age children have CSOM [3]. One significant contributor to avoidable hearing loss is CSOM. Severe, even fatal side effects, including intracranial and extracranial problems, might arise from inadequate treatment. The microorganisms causing CSOM can be identified to aid in the selection of the most suitable antibiotic for the treatment plan, as CSOM can result in considerable morbidity. We carried out an investigation to assess the present bacteriological profile of the microorganisms causing CSOM and to look at their pattern of antibiotic susceptibility to drugs that are currently on the market.

Materials and Methods

The present cross-sectional study was conducted in the department of ENT at our tertiary care hospital. The patients diagnosed with chronic suppurative otitis media were included based on convenient sampling. Patients not willing to provide the consent, otomycosis, acute otitis externa, cholesteatoma, and tympanostomy tube as well as patients receiving either topical or systemic antibiotic or antifungal treatment within the 2 weeks before sampling. were excluded from the study. Informed consent was obtained from all patients included in the study. The study was approved by institutional ethical committee. A thorough clinical history was acquired, encompassing age, gender, length of discharge, and prior use of antibiotics. The information was gathered from the patients' medical records as well as during the session. An examination using otoscopy and microscopy was conducted, and then aural toileting. The type of ear discharge, the size and location of the tympanic membrane perforation, and the condition of the middle ear were all noted. Under aseptic conditions, a sample of middle ear discharge was taken from the perforated tympanic membrane area using an otomicroscope, a sterile aluminum stick, and an applicator with a cotton wool tip measuring 1.5 mm in diameter. After being gathered, the specimen was submitted to the microbiology lab for examination and put in Amies transport media.

The material was inoculated on blood agar, MacConkey's agar, and chocolate agar. The plate was incubated for 24 to 48 hours. Blood agar and MacConkey's agar were incubated in O2 medium, and chocolate agar was incubated in a CO2 medium for 24 to 48 hours.

Microscopic examination was performed to identify microorganisms and their antibiotic sensitivity using the modified Kirby-Bauer disc diffusion technique in Mueller-Hinton agar. The inhibition zone diameter was interpreted following the 2017 Clinical Laboratory Standards

Institute guideline.4,5 Data were collected and recorded and then analyzed using the Statistical Package for Social Science (SPSS) version 24.0.

Results

The present study included a total of 60 patients aged between 1 years to 50 years based on inclusion and exclusion criteria who presented with CSOM. Out of the 60 patients enrolled 29 were males and 31 were females. Majority of the patients were in the age group 1-10 years.[Table 1]

Table 1: Shows age-wise and gender wise distribution of patients		
	Number =60	**Percentage**
Age-wise distribution		
1-10 yrs.	20	33.5%
11 – 20 yrs.	12	20%
21 – 30 yrs.	10	16.6%
31 – 40 yrs.	9	15%
41 – 50 yrs.	9	15%
Gender wise distribution		
Males	29	48.33%
Females	31	51.66%

Table 2: Clinical presentation of Study Subjects

Clinical presentation	Number of Cases=60	Percentage
Affected side		
Unilateral	38	63.33
Right	12	20
Left	10	16.66
Bilateral		
Precipitating factors		
Upper respiratory tract infection	30	50
Allergic rhinitis	14	23.33
Nil	16	26.66
Associate symptoms		
Hearing loss	32	53.33
Pain	6	10
Itchiness	16	26.66
Nil	6	10
Characteristic of discharge		
Mucoid	12	20
Mucopurulent	24	40
Purulent	24	40
Odor		
Foul smelling	4	6.66
Nonfoul smelling	56	93.33

Table 2 presents the clinical presentation of CSOM patients, it is seen that 63.33% had unilateral, 20% had right sided and 16.66% had left sided CSOM. The precipitating factors for CSOM included upper respiratory tract infections, allergic rhinitis and no precipitating factors in 50%, 23.33% and 26.66% respectively. Hearing loss, pain, itchiness were the associated symptoms seen in 53.33%, 10% and 26.66% respectively. Mucoid, mucopurulent, purulent discharge was seen 20%, 40% and 40% respectively. 6.66% had foul smelling discharge and 93.33% had non-foul smelling discharge.

Table 3: Shows microbiological profile in CSOM patients		
Clinical presentation	Number of Cases=60	Percentage
Gram positive bacteria		
Staphylococcus Aureus	14	23.33
Streptococcus Spp	3	5
Enterococcus Spp	2	3.33
Gram negative bacteria		
Pseudomonas aeruginosa	16	26.66
Pseudomonas Spp	3	5

Klebsiella	2	3.33
Acinetobacter	2	3.33
Proteus	1	1.66
Enterobacter	2	3.33
Citrobacter	2	3.33
E Coli	1	1.66
H Influenza	1	1.66
Serrata marcescens	2	3.33
Fungal organisms		
Candida	5	8.33
Aspergillus	2	3.33
Scedosporium	1	1.66

Table 3 presents microbiological profile in CSOM patients. It is seen that 31.66% had gram positive bacteria, 48.29% had gram negative bacteria and 13.32% had fungal organisms. The most common organism isolated was pseudomonas aeruginosa followed by staph aureus.

Table 4: Shows antibiotic susceptibility pattern of gram positive organisms

Antibiotic	Staph aureus (n=14)	Strepto spp (n=3)
Trimethoprim-sulfamethoxazole	11	2
Erythromycin	12	3 (100%)
Clindamycin	12	3 (100%)
Gentamycin	13	1
Tetracycline	-	1
Rifampin	15 (100%)	-
Ciprofloxacin	12	-
Cephalexin	-	3
Chloramphenicol	-	3
Fusidic acid	15	-

Discussion

Chronic suppurative otitis media (CSOM) is a chronic inflammation of the middle ear with perforation of the tympanic membrane and discharge from the ear for more than two months, either continuously or intermittently [4]. According to the WHO, CSOM affects between 65 and 330 million people worldwide, 60% of whom suffer from hearing loss. Meanwhile, the incidence is 9 cases per 100,000 inhabitants [5].

The high incidence of CSOM is influenced by the etiology and pathogenesis of CSOM itself.

There are several contributing factors such as infection, anatomy or physiological dysfunction, environment, allergy or patient actors including immunity, gender and others. Clinically, CSOM is classified into two types, namely tubotympanic and atticatral. CSOM disease begins with otitis media, which lasts a long time and is not adequately treated [6]. The present study included a total of 60 patients aged between 1 years to 50 years based on inclusion and exclusion criteria who presented with CSOM. Out of the 60 patients enrolled 29 were males and 31 were females. Majority of the patients were in the age group 1-10 years.[Table 1] Table 2 presents the clinical presentation of CSOM patients, it is seen that 63.33% had unilateral, 20% had right sided and 16.66% had left sided CSOM. The precipitating factors for CSOM included upper respiratory tract infections, allergic rhinitis and no precipitating factors in 50%, 23.33% and 26.66% respectively. Hearing loss, pain, itchiness were the associated symptoms seen in 53.33%, 10% and 26.66% respectively. Mucoid, mucopurulent, purulent discharge was seen 20%, 40% and 40% respectively. 6.66% had foul smelling discharge and 93.33% had non-foul smelling discharge. Table 3 presents microbiological profile in CSOM patients.

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Conclusion

The bacteriological profile of CSOM showed a high prevalence of P aeruginosa, followed by S aureus. It is seen that 100% susceptibility for staph aureus was seen for Rifampin and 100% susceptibility for strep spp was seen for erythromycin and clindamycin. We observed a declining pattern of their antibiotic sensitivity. It is important to be aware of the current trend of the bacteriological profiles and to revise the antibiotic regime according to both the sensitivity and age groups.

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