Original Article

CSOM

Infective Organism and Antibiotic Sensitivity Analyzed in Chronic Suppurative Otitis Media Patients in Mirpur, AJK

Ehtishamul Haq[1], Tariq Mahmood Mughal[2], Syed Manzoor Iqbal[3], Shakeel Ghani[4] and Tyab Ilyas[5]

ABSTRACT

Objective: To analyze the bacteriological isolates and antibiotics sensitivity for each bacteria causing ear infection resulting in CSOM.A main objective of the study is to avoid excess and incorrect prescription of antibiotics resulting in antibiotic resistance in study area.

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted at the Divisional Headquarter Teaching Hospital Mirpur AJK from April 2012 to December 2014.

Materials and Methods: Seventy patients of Chronic Suppurative Otitis Media were evaluated on the basis of bacteriological investigation, culture and sensitivity along with Patient`s parameters like age, clinical features (ear discharge and pain) were documented in the outpatient department of ENT. Informed consent was taken from all the patients. Sample was taken via sterile swabs which were obtained from discharging ear/ears and cultured both aerobically and anaerobically. Sensitivity pattern of causative organism was established according to standard protocols. The antibiotic sensitivity of the confirmed organisms was performed by disk diffusion method (Baurer *et al*., 1966; Ahmed *et al.,* 2008).

Results: Data analysis of CSOM cases during the current study revealed that major CSOM prevalence 70% was in age <30 years and Staphylococcus aureus (67%) was the dominant agent caused CSOM in the study area, followed by the Pseudomonas aeruginosa (17%). Satph. aureus which accounted 57% of chronic otitis media in the study area found 100 sensitive for Ciprofloxacin, Moxifloxacin, Cefixime and Sulzone. While Doxicycline, Rocephin are more than 90% sensitive and Sparfloxacin, Gentamicin, >80% sensitive and Meropenum, Clarithomycin, Cephradine found >70% sensitive for Staph. aureus.

Conclusion: Study mainly focused on major causative agents and mean prevalence age for CSOM so that prompt treatment and prevention strategy could be developed in the study area to prevent complications with CSOM.

Key Words: Chronic Suppurative Otitis Media, Staphylococcus aureus, sensitivity.

Citation of article: Haq E, Mughal TM, Iqbal SM, Ghani S, Ilyas T. Infective Organism and Antibiotic Sensitivity Analyzed in Chronic Suppurative Otitis Media Patients in Mirpur, AJK. Med Forum 2017;28(5):174-177.

INTRODUCTION

Excess and inaccurate prescription of antibiotics resulting in increased bacterial resistance. Several studies have revealed treatment indication, antibiotic choices and period of antibiotic therapy are incorrect in 50% cases generally[1,2].

Chronic Suppurative Otitis Media (CSOM) is defined as the inflammation of middle ear or mastoid cavity causing perforation of tympanic membrane leading to recurrent or persistent ear discharge[3].

[1.] Department of EPI / Pathology[2], Divisional Headquarter Teaching Hospital Mirpur AJK.
[3.] Department of Pathology, MBBS-MC, Mirpur, AJK.
[4.] Department of ENT, AJK MC Muzaffarabad, AJK.
[5.] Department of P&D, Muzaffarabad, AJK.

Correspondence: Dr. Ehtishamul Haq, Technical Officer, Department of EPI, Divisional Headquarter Teaching Hospital Mirpur AJK.
Contact No: 0300-5119890
Email: drehtisham@gmail.com

Received: March 20, 2017; Accepted: April 23, 2017

The infection reaches the middle ear through the Eustachian tube[4]. CSOM and its complications are among the most common presentation encountered by ENT specialists and general practitioners, most cases resulting from either untreated or under treated Acute Suppurative Otitis Media. In 1990's, CSOM and its complications particularly brain abscess caused an alarming situation leading to 28000 deaths[5]. It has high incidence and chronicity due to peculiar anatomy of middle ear and repeated infections through Eustachian tube. Other factors which lead to chronicity include bacterial resistance; prolong treatment, lack of compliance and also ototoxicity with both topical and systemic antibiotics[6].

Chronic Suppurative Otitis Media (CSOM) is prevalent worldwide[7] and the prevalence of chronic Otitis media cases in the general population of South East Asia is approximately 5.2% according to the World Health Organization report published in 2004. The prevalence is between 2&17% in India, Bangladesh and various countries in Africa. CSOM is the most common cause of preventable hearing loss in Pakistan and It is a major problem in other developing countries as well.[8,9]

Most common micro organisms found in CSOM are Pseudomonas aeruginosa, Staphylococcus aureus, Proteus mirabilis, Klebsiella pneumoniae, Escherichia coli, Aspergillus spp and Candida spp. varying in various geographical areas[8] while anaerobic bacteria include bacteroid sppss[10].

Traditionally CSOM was classified as "Safe" (tubotympanic) and "Unsafe" (Atticoantral) disease. As bone erosion was an inherent pathological feature in unsafe disease so it was also called as erosive middle ear disease[11,12].

In developing countries, CSOM causing deafness in more than one third of the population has profound impact on society, and is believed to be responsible for intellectual and educational problems in children by causing deafness in more than two thirds of them[13]. Frequent upper respiratory tract infections and poor socio economic condition, poor hygiene, under nutrition and misuse of antibiotics may lead to the development of CSOM[14,15]. and the prevalence of complications is comparatively higher leading to any disability or even death[16]. The other important factors associated with its occurrence are overcrowding, failure towards infection control, and lack of trained staff in controlling infections in hospital. Knowledge of the pattern of local micro-organisms causing CSOM and their antibiotic sensitivity is therefore essential for an accurate and cost effective treatment.[17] Therefore, the main objective of this study was to identify the root cause, pathogenic bacteria along with their antibiotic sensitivity in CSOM patients in Mirpur AJK.

MATERIALS AND METHODS

CSOM patients attending the OPD Clinic of Ear, Nose and Throat (ENT) specialist at Divisional Headquarter teaching hospital, who had no antibiotic treatment for the previous three days, were referred to the pathological Laboratory for bacteriological investigation, culture and sensitivity.

A total of 70 patients were included in the study, history regarding the age, duration of ear discharge and especially any antibiotic treatment received. Though clinical examination was done to rule out acute otitis media and otitis externa. Sterile cotton swabs were used to collect pus from discharging ears. Patients were of both genders and from all age groups. Inclusion and exclusion criteria were set as follows: Patient of any age, patient of any sex, ear discharge of more than 3 months duration were included. Discharge of less than 3 months duration, discharge with intact tympanic membrane (otitis externa) and patient receiving antibiotics at presentation were excluded.

The ear/ears discharge was collected on two swabs with a sterile swab stick, one used for microscopy and the other for culture from each patient and the samples were aseptically cultured on MacConkey agar, Blood and Chocolate agars plates within three hours. The plates were incubated aerobically and Chocolate agar plates were incubated an-aerobically in a candle jar, moisturized with soaked cotton at 37°C for 24-48 hours. The colonies were identified by colony morphology and Gram stain. The Gram negative organisms were confirmed by setting biochemical tests following the World Health Organization Manual for Laboratory Investigations of Acute Enteric Infections 1987 and the Gram positive bacteria by Gram stain, catalase and coagulase enzyme reaction tests.

The antibiotic sensitivity of the confirmed organisms was performed by disk diffusion method (Baurer *et al*., 1966; Ahmed *et al.,* 2008). One ml of each identified bacterial isolate was prepared from an overnight culture and adjusted to 0.5 McFarland Standard. A sterilized wooden swab was soaked in each culture and used to streak on Mueller-Hinton agar (MHA) plates and allowed to dry at room temperature. Commercially available sterile discs at specific concentrations of Ampicillin (30ug), Augmentin (30ug), Ofloxacin(5ug), Cephalexin (30ug) Cephradine (30ug), Ceftrixone (30ug), Cefotaxime (30ug) and Erythromycin (10ug) were placed aseptically on the pre streaked agar plates with sterilized forceps. *E. coli* ATCC 25922, sensitive to all these drugs, was used as a control and the sensitivity of the antibiotics was recorded by measuring the zone of inhibition around the discs for each of the isolated cultures in millimeters (mm).

The interpretation of the measurement for sensitive and resistant bacteria was made according to the manufacturers' standard zone size. Percentage resistance and sensitive zone sizes were calculated using the formulas PR=a/bx100 and PS=c/dx100.Where PR is percentage resistance; a is number of resistant isolates; b is number of tested isolates; PS is percentage sensitivity; c is number of sensitive isolates and d is number of tested isolates against antibiotics.

RESULTS

70 patients attended ENT department of Divisional Head Quarter Teaching Hospital in Mirpur, AJK were studied for Chronic Supportive Otitis Media. Main focus of the study was to observe the growth pattern and bacteria isolated responsible for infection in the study area. Data analysis revealed, out of 70 (100%) cases of CSOM 13(19%) cases were below 10 years age, 21(30%) were between 10-20 years age, 19(27%) of CSOM cases were between 20-30 years, 10 (14%) cases were between 30-40 years of age while 4(6%) and 3(4%) of cases were from 50 and 60 and 60+ age respectively. CSOM major case burden is in early 30 years of life in the study area (table 1 and figure 1).

Cases distribution by ear involvement: Among the 70 (100%) cases included in the current study right ear was involved in 44% of the cases, 41% involved left ear and only 15% of cases having involved both the ears (figure 3).

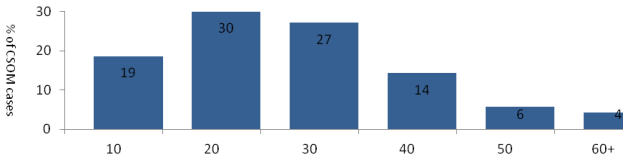

Figure No.1: Age wise distributation of CSOM cases

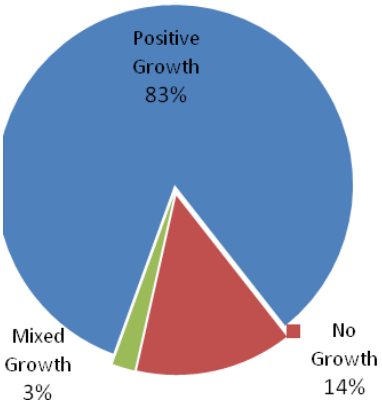

Figure No.2: Culture Growth Pattern

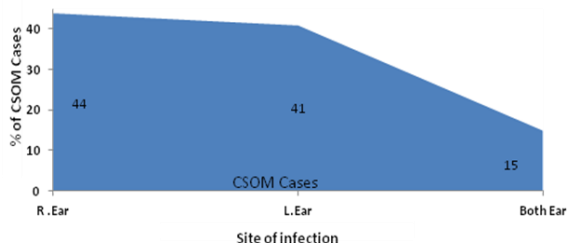

Figure No.3. CSOM Cases distribution by ear involvement

Bacterial isolates: Data analysis of CSOM cases during the current study revealed that Staphylococcus aureus (57%) was the dominant agent which caused CSOM in the study area, followed by the Pseudomonas aeruginosa (15%). While Streptococcus pyogenes, Proteus mirabilis and E. coli accounted for 4%, 3% and 4% respectively and 3% confirmed mixed growth and 14% of the samples remain negative for any growth (Figure 4).

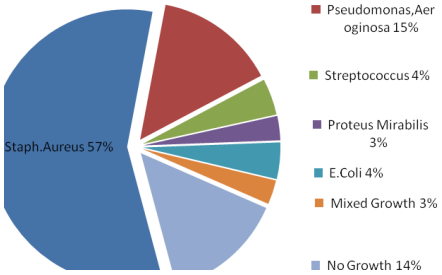

Figure No.4: Bacterial isolates of CSOM cases

Antibiotics sensitivity for each bacterial isolates of CSOM cases: Satph aureus which accounted 57% of chronic otitis media in the study area found 100 sensitive for Ciprofloxacin, Moxifloxacin, Cefixime and Sulzone while Doxicycline, Rocephin are more than 90% sensitive and Sparfloxacin, Gentamicin, >80% sensitive and Meropenum, Clarithomycin, Cephradine found >70% sensitive for Staph. aureus.

Second organism which caused infection in 17% of CSOM cases found sensitive to Meropenum in 8/73%, Sulzone 7/64%, Tazobactam 6/55%, Imipenum 5/45%, Piperacillin 4/36% and Polymyxin 4/36% cases found sensitive.

E. coli was the third largest infecting organism in CSOM cases found 100% sensitive to Sparfloxacin, Ofloxacin, Moxifloxacin, Gentamicin and Sulbactum.

Streptococcus aureus also infected4% of the CSOM cases found sensitive to Amoxycillin and Clarithromycin and up to some extent Doxycycline and Rociphin.

Proteus mirabilis infected 2/3% out of 70/100% CSOM cases included in the study. Proteus mirabilis was found sensitive for Levofloxacin, Amikacin, Gentamicin, Rociphin and Sulzone.

Table No.1: Antibiotic sensitivity for each bacterial isolates from CSOM cases

Staph. aureus (40/57%)			**Pseudomonas, aeruginosa (11/15%)**			**E. coli (3/4%)**			**Streptococcus (3/4%)**			**Proteus mirabilis (2/3%)**		
Antibiotics	n	%	Antibiotics	n	%	Antibiotics	n	%	Antibiotics	n	%	Antibiotics	n	%
Ciprofloxacin	40	100	Meropenum	8	73	Sparfloxacin	3	100	Amoxycillin/ Clavulanic Acid	3	100	Levofloxacin	1	50
Moxifloxacin	40	100	Sulzone	7	64	Ofloxacin	3	100	Clarithromycin	3	100	Gentamicin	1	50
Cefixime	40	100	Tazobactam	6	55	Moxifloxacin	3	100	Amoxycillin	2	67	Piperacillin	1	50
Sulzone	40	100	Imipenum	5	45	Gentamicin	3	100	Doxycycline	1	33	Cefotaxime	1	50
Doxycycline	39	97.5	Piperacillin	4	36	Sulbactum	3	100	Rociphin	1	33	Amikacin	1	50
Rocephin	37	92.5	Polymyxin	4	36							Meropenum	1	50
Sparfloxacin	34	85										Rociphin	1	50
Gentamicin	33	82.5										Sulzone	1	50
Meropenum	31	77.5												
Clarithomycin	29	72.5												
Cephradine	29	72.5												

DISCUSSION

Staph aureus was isolated from 40/50% of CSOM cases and most leading cause of CSOM followed by the followed by the Pseudomonas aeruginosa (15%) while Streptococcus pyogenes, Proteus mirabilis and E. coli accounted for 4%, 3% and 4% respectively.

As for antibiotic sensitivity is concerned Ciprofloxacin, Moxifloxacin, Cefixime and Sulzone. While Doxycycline, Rocephin are more than 90% sensitive and Sparfloxacin, Gentamicin, >80% sensitive and Meropenum, Clarithromycin, Cephradine found >70% sensitive for Staph. aureus.

Second leading cause of CSOM in study area was Pseudomonasaeruginosa which found sensitive for Meropenum in 8/73%, Sulzone 7/64%, Tazobactam 6/55%, Imipenum 5/45%, Piperacillin 4/36% and Polymyxin 4/36% cases

CONCLUSION

Misuse of antibiotics develops resistance. This study concludes; promptly and timely management of CSOM reduces the chances of permanent damage to hearing, identified the common causative organisms of CSOM and their sensitivity pattern against various antibiotics.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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