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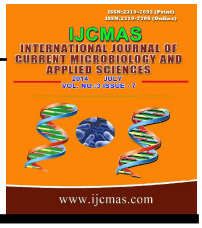

Original Research Article

Bacterial isolates and their antibiotic susceptibility in chronic discharging ears in UAE population

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A B S T R A C T

The main objective of our study is to isolate and identify different pathogens in chronic discharging ears in UAE population and to determine their susceptibility patterns to commonly used antibiotics in this age of emerging resistance which is essential for definitive treatment. A prospective study was carried out with a sample size of 105 patients having chronic discharging ears attending Ent outpatient clinic from jan 2013 to dec 2013.Ear swabs were taken from those patients and cultured for bacterial isolates using blood agar,chocolate agar and MacConkey agar. Culture plates were incubated aerobically at 37 degree for 24-48 hrs, isolates were identified according to standard microbiological methods and antibiotic sensitivity test was performed using disc diffusion method. A total of 102 microbial isolates (gram +ve 14, gram -ve 85and3 fungi) were obtained. The most common causative organisms isolated were Pseudomonas aeruginosa(65.7%) followed by Staphylococcus aureus (8.5%).No growth is seen in 3 cases. *Pseudomonas aeruginosa* isolates were susceptible to all the antibiotics especially ciprofloxacin(100%) and amikacin(95%).Among the commonly used topical agents in the treatment of csom, gentamycin was the most effective..Periodic monitoring of the microbiological profile along with their sensitivity pattern is essential for formulating an effective antibiotic policy for csom.

Keywords

Chronic suppurative otitis media. *Pseudomonas aeruginosa*, Aminoglycosides, Quinolones

Introduction

Chronic discharging ears are nothing but chronic suppurative otitis media which is a infection of mucoperiosteal lining of middle ear cleft invoving Eustachian tube, tympanic cavity and mastoid air cells characterised by the presence of persistent perforation of the tympanic membrane with recurrent or persistent mucoid or mucopurulent discharge of atleast 8 weeks duration.Although it is a disease more commonly seen in developing countries ,but still it remains as one of the major health concern leading to hearing impairment in developed countries like UAE

In many cases of csom the antibiotics are prescribed indiscriminately.The consequences are treatment failure,the emergence of resistant strains of organisms,superinfection,intracranial and extracranial complications and lengthening the treatment costs and suffering.(Maji P K et al 2007)

The disease remains a global health problem leading to hearing impairment which may have serious long term effects on language,auditory and cognitive development and education is a nuaisance both for the surgeon and the patient.Today majority of otogenic complications like facial palsy,intracranial and extracranialabscee and meningitis are a result of csom,the characteristic of bacteriology is mainly pseudomonas aeruginosa along with bacillus proteus and E coli as shown by earlier studies.our objective of the study is to evaluate microbiological pattern of csom in UAE population and to determine the susceptibility of aerobic pattern of bacterial isolates.(Karan sharma et al 2010)

Materials and Methods

The prospective study was conducted for a period of one year from jan 2013 to dec 2013 in a tertiary medical centre of emirate of Fujairah UAE.A total of 100 patients were selected for the study presenting with chronic discharging ears of more than 12 weeks duration.Only those patients who were not on any antibiotics (oral &systemic) in the previous study were included in the study.

Informed consent was taken from the patient under aseptic precautions .An ear swab was obtained by inserting a sterile swab deep in the ear canal and the discharges were added to stuart transport medium and sent to microbiology test lab for culture and sensitivity tests.By means of a sterilised forceps, the swab stick was picked from the transport medium.This was inoculated on blood,choclate and Mac Conkey agar plates.Sterilised inoculated wire loop was then used to streak the smear.The plates of blood and Mac Conkey were placed in an aerobic incubator,while the chocolate plate was incubated in a carbondioxide enriched atmosphere for 18-24 hrs after which plates were read and isolates identified according to standard methods.

Antibiotic sensitivity testing was performed using modified Kirby Bauer disc diffusion method.Pure colonies of isolates were suspended in sterile nomal saline inside bijou bottles and the turbidity of suspension adjusted to 0.5 McFarlands standard.

Zone diameter of inhibition around each disc were measured using a calibrated ruler and interpreted according to standard clinical guideline. *Staphylococcus aureus, Escherichia coli and Pseudomonas aeruginosa* were used as controls for gram positive, gram negative and pseudomonas aeruginosa isolates respectively.Antibiotic discs used were Amoxicillin clavulanic acid (10µ),azithromycin (5µ),cefuroxime (30µ),ciprofloxacin (5µ),gentamycin (30µ),clarithromycin (15µ),ofloxacin (5µ),cefixime(30µ) etc.(Cheesbrough 2000)

Results and Discussion

A total of 105 patients in the age group from 0-70 years were enrolled in the study .Male to female ratio was 1.91:1

Microbiology of 105 patients were studied in patients with chronic discharging ears.A search was made for

organism, their susceptibility patterns to different antibiotics. Most of the patients belong to 21-30 years of age group. (33.3%) (Table 1) with male to female ratio 1.91:1 Gram stain pattern of bacterial isolates from the middle ear of patients with chronic discharging ears showed that gram –ve constitute 85 cases (80.95%) while gram +ve 14 cases(13.3%)and in some cases there is evidence of fungal growth 3 cases(2.8%) and no growth is seen in 3 cases (2.8%).The most common isolate cultured is pseudomonas aeruginosa (65.7%) followed by klebsiella (9.5%) and staphylococcus aureus (8.5%) (Table2).

Pseudomonas aeruginosa isolates were susceptible to all the antibiotics especially ciprofloxacin (100%) and amikacin (95%).Among the commonly used topical agents in the treatment of csom ,gentamycin (100%) was the most effective against pseudomonas,gram +ve and gram -ve isolates . Neomycin is the least effective with 20% of all the isolates sensitive to this antibiotic.Cephalosporins (100%) and amoxicillin clavulanic acid (100%)were the most effective antibiotics against staphylococcus aureus(Table3 &4)
Csom typically occurs when chronic middle ear infection prevents healing of an acute perforation.Chronic or inadequately treated middle ear infection in the presence of a perforation may allow squamous epithelial migration over the free edges of a perforation making it permanent(Ali qureshi et al 2014).Although bacterial cultures are useful in treating drug resistant organisms,studies have established that 90-100% of chronically discharging ears yield two or greater isolates of aerobic and anaerobic bacteria.(WHO 2004)

This study revealed gram -ve organisms outnumber the gram +ve rods in csom as it is found similar in another study by rajatPrakash et al.(2013)

In the present study pseudomonas aeruginosa (65.7%),klebsiella (9.5%)and staphylococcus aureus (8.5%) were the most common isolates isolated in chronic discharging ears in UAE population.This is in tandem with the observations made by many other authors.(Loy(2002)et al,Yeo SG (2007) et al,Indhudharan (1999) et al,Pollock m (1996)

Even though anerobes play a role in the pathogenesis of chronic discharging ears,our study sample did not show any isolate.This could be due to prior use of antibiotics or differences on sampling and processing techniques or small number of cases included in this study .(Shashidharvishwanath et al (2012))
Topical agents are useful in the treatment of chronic discharging ears.Ciprofloxacin and gentamycin are active against most of the isolates tested respectively.Similar results obtained in a study conducted by RajatPrakash et al (2013).Amikacin was found to be the most effective aminoglycoside,however its unavailability as topical preparation prevents its routine use.The risk of ototoxicity by using aminoglycoside preparations remains a subject of discussion.However ,few cases of ototoxicity are reported in world literature despite its widespread use. (Haynes et al 2007)

Multiple studies have supported the efficacy of topical quinolones in the management of acute otitis media,acute otitis externa and csom.The quinolone drops have a superior safety profile and a broad antimicrobial spectrum.(Myer 2004)
Pseudomonas aeruginosa is the commonest organism isolated in our study could be related to several factors

as stated by Pollock in his study that the abilty of p aeruginosa to survive in competition with other organisms may be due to minimum nutrition requirement,its relative resistance to antibiotics and its armamentarium of antibacterial products iepyocyanin and bacteriocin.Also pseudomonas aeruginosa uses its pile to attach to the necrotic or diseased epithelium of the middle ear.Onceattached,the organism produces enzymes like proteases, lipopolysaccharides etc to elude from normal defence mechanism of body required for fighting infections.(Pollock m 1996). Kenna et al (1986) and chandrashekhar et al (2004) also found p aeruginosa as the predominant organism in 67% and 46.7% cultures respectively. The present study showed coliforms such as klebsiella pneumonia and E coli in 9.5% and 1.9% of the cases .This study is in tandem with rajatPrakash et al (2013) report showing klebsiella in 9.42% and E coli in 7.33%cases respectively.

Pseudomonas aeruginosa showed maximum sensitivity to ciprofloxacin (100%) and gentamycin (100%) .These results is in par with other reports (K Mozafari et al 2011). Amikacin found to be the most potent aminoglycoside against all gram -vepathogens,however its unavailability as topical preparation prevents its routine use. (Karan sharma et al 2010) The present study shows Staphylococcus aureus having high sensitivity to amoxicillin clavulanic acid and cephalosporins.This is in parallel with other report (Shashidharvishwanath et al 2012).

Fungal infections of the middle ear are common with fungi thrive well in moist pus.our study showed fungal isolates in 2.8% of the cases.Study in Singapore on 90 patients of otitis media accounted for 8.8% of the total isolates (Rajatprakash et al 2013).

Table.1 Distribution of middle ear diseases in different age groups in the study population

AGE	MALE	FEMALE	TOTAL	
0-10	10	07	17	6.6%
11-20	06	01	07	16.1%
21-30	23	12	35	33.3%
31-40	13	08	21	20%
41-50	08	04	12	11.4%
51-60	06	03	09	8.5%
61-70	03	01	04	3.8%
	69	36	105	

Table.2 The bacteriological findings obtained from 105 CSOM patients

	Type of organisms	Number of isolates	percentage
Gram +ve	*Staphylococcus aureus*	09	8.5
	Streptococcus pyogenes	05	4.8
Gram -ve	*Pseudomonas aeruginosa*	69	65.7
	Klebsiella	10	9.5
	Proteus mirabilis	04	3.8
	E.Coli	02	1.9
Fungal growth	*Aspergillu sniger*	02	2.0
	Aspergillus flavus	01	0.9
No growth		03	2.8

Table.3 Shows the susceptibility pattern of gram +ve bacterial isolates to various antibiotics

Type of organisms	A	AC	cd	cr	cfr	cl	cta	ce	cmc	amc	ci	gm	ne	ofc	levo
Staphylococcus aureus	90	100	NT	NT	100	70	90	NT	45	45	45	85	10	80	85
Streptococcus pyogenes	100	100	100	100	100	100	100	90	100	100	00	NT	00	90	90

A-Amoxicillin,AC-Amoxicillin-clavulanate,cd-cefdinir,cr-cefaclor,cfr-cefuroxime,cl-cephalexin,cta-cefotaxime,ce-cefixime,cmc- clarithromycin,Amc-azithromycin.ci-ciprofloxacin,gm-gentamycin,ne-neomycin,ofc-ofloxacin,levo-levofloxacin.

Table.4 Shows the susceptibility pattern of gram -ve bacterial isolates to various antibiotics

	AP	AC	ce	cfr	ctr	ci	ct	ak	gm	to	ne	of	lf
Pseudomonas aeuruginosa	NT	00	NT	30	90	100	00	85	100	70	20	90	90
klebsiella	00	100	85	85	100	75	100	100	100	NT	20	75	75
Proteus mirabilis	10	100	60	60	100	100	100	100	100	NT	00	100	100

AP-Ampicillin,AC-Amoxicillin clavulanate,ce-cefixime,cfr- cefuroxime,ctr-ceftriaxone,ci-ciprofloxacin,ct-cotrimoxazole,ak-amikacin,gm-gentamycin,to-tobramycin,ne-neomycin,of-ofloxacin,lf-levofloxacin

It is concluded from our study that pseudomonas aeruginosa plays a major role in causing chronic discharging ears in UAE population.Ciprofloxacin and gentamycin are found to be the most effective local and systemic antibiotic.In

the era of antibiotic resistance periodic monitoring of microbiological profile along with their antibiotic sensitivity pattern is needed for effective management in csom.

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