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**ANTIBIOTIC SENSITIVITY PATTERN OF BACTERIA ISOLATED FROM EAR
DISCHARGE**

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ABSTRACT

Acute otitis external discharges from ear of patients attending Wesley Guild Hospital, Ilesa, Nigeria were cultured on a nutrient agar for possible pathogens. *Staphylococcus aureus* and *Pseudomonas aeruginosa* was the Gram- positive and Gram- negative bacteria isolated from the samples collected. The antibiotic susceptibility testing carried out on the isolates revealed that some were resistance to some of antibiotics used. Resistant was high in Gram-positive and Gram-negative isolates especially to Augmentin (100%), Amoxicillin (100%), Gentamycin (99%), Ceftriazone (95%), Cotrimoxazole (94%), Chloramphenicol (94.4%), Erythromycin (89%) and Tetracycline (77.8%) , likewise most of the Gram-positive and Gram-negative isolates were highly sensitive to ciprofloxacin (100%), Ofloxacin (94.4%) and Streptomycin (50%) for both in positive antibiotic discs respectively.

Keywords: Acute Otitis, Antibiotics, Ear Discharge

INTRODUCTION

Ear discharge in particular acute otitis externa is relatively serious and unpleasant bacterial infection of the ear. It is one of the most common diseases encountered by an otolaryngologist. It is defined as redness or swelling of the external auditory canal or debris within the canal, accompanied by pain, itchiness discharge (otorrhoea), loss of hearing or pain stuffy feeling for more than three weeks duration [1].

Acute otitis could arise either primarily in the meatus or be a manifestation of a generalized skin condition like seborrhoeic dermatitis, atopic dermatitis, psoriasis etc. Some can appear as secondary otitis media. Those arising primarily in the meatus could be either localised otitis externa (Furunculosis) or malignant otitis externa. Acute diffuse is also known by various colloquial names which include swimmer ear, hot weather ear, and some people simply call it as acute otitis externa [2].

Otitis externa affects all age groups and both sexes. [3] reported that the mean age of patients affected was 39 years, the range being from one to eighty four years, and females were found to be affected more frequently than males. [4] also found that females were more frequently affected than

males and that otitis externa affected all age groups ranging from 5 to 80 yrs, with a peak age incidence between 25 – 45 years.

In severe acute otitis externa, the canal lumen becomes completely obstructed and drains grey-green secretion and desquated debris; the canal skin becomes oedematous and popular, there is marked periauricular edema and adematopathy; and the patient complains of intense pain. The main complain of patient with present as atropic canal skin and a lumen devoid of carman (Balkany, 1998). Scratches may be seen in the canal skin which is covered with extoliated debris. Later on, there can be external canal stenoses. One of the common presentations of acute otitis externa is with furuncle in the external auditory canal. Furunculosis is a localized, erythematous, postular lesion surrounding a single hair follicle and is usually caused by *Staphylococcus aureus* [5].

As the condition progresses, the pain becomes more severe and the meatus becomes occluded by swelling which causes deafness. The furnicle may burst and present as ear discharge. A surrounding cellulitis and regional lymphadentis may develop. In case of necrotizing otitis externa (also known as misleading or as malignants otitis externa)

patient complain of progressive severe stalgia that worsens at night along with purulent discharge [6, 7].

MATERIALS AND METHODS

Sterilization of Materials

Glass wares which include conical flasks, beakers, test tubes, pipettes, McCartney bottles were washed with detergent after which they were rinsed and sterilized in the oven at 160°C for 1 hour. Inoculating loops and forceps were heated to redness in a Bunsen burner. The spatula, scalpel, mortar and pestle were disinfected with 70% alcohol.

Source of Sample

Samples of ear discharge were collected from the out-patient Department of Wesley Guild Hospital, Ilesa.

Collection of Clinical Data

All the patients attending Wesley Guild hospital with complains of earache, and which has been diagnosed with severe cases of ear discharge infection, were investigated by collection of discharged pus.

Collection of Sample

A designed sterile swab stick was used to collect specimen from the external auditory canal from the ear with acute otitis media. A sterile aural speculum was used to visualized

the canal property while taking swab in case of children and adults with a narrow canal. Swab was taken from the site of any visible discharge in the canal, while collecting specimen from external auditory canal of ear with acute otitis external.

Standardization of Inoculums

The nutrient broth was sterilized and pure culture of the organism was transferred from slant unto the sterilized nutrient broth and then incubated

Antibiotics Susceptibility Testing

Susceptibility of isolates to different antibiotics were tested following Kirby Bauer disc diffusion method [8] using Muller Hinton Agar against selected antibiotics, namely Ampicillin (A) 25mcg, Chloramphenicol (C) 50mcg, Kanamycin (K) 30mcg, Streptomycin (S) 30mcg and Tetracycline (T) 100mcg (Hi-Media, Mumbai). Amoxicillin (30 µg), amoxicillin-clavulanic acid (30 µg), cefoxitin (30 µg), cefotaxime (30 µg), ceftriaxone (30 µg), cefuroxime (30 µg), ceftazidime (30 µg), gentamicin(10µg), ofloxacin (30 µg), levofloxacin (30 µg), ciprofloxacin (30 µg) (Oxoid,UK). Inhibition zone size was interpreted using standard recommendation of National Committee for Clinical Laboratory

Standards [9] now known as Clinical Laboratory Standard Institute (CLSI).

RESULTS

Table 1 shows the growth present in total 6 samples of acute otitis external collected which is isolate were recovered.

Table 2 shows the zones of inhibition by impregnated gram positive antibiotics discs and then measured with calibrated ruler in millimeters (mm). It was found that ciprofloxacin show the highest zone of inhibition in positive antibiotic discs while cotriazone show the least zones of inhibition.

Zones of inhibitions exerted by negative antibiotic discs were shown in table 3. They were measured with calibrated ruler in millimeter (mm). It showed that ciprofloxacin and ofloxacin were most active on the isolated organism with highest zones of inhibition, while the organisms showed resistance to

augmentin and gentamycin with the least zones of inhibition. **Figure 1** shows the graphical representation of zones of inhibition of both positive and negative antibiotic discs.

Table 4 shows the antibiotic susceptibility pattern from positive antibiotic discs. It was found that Gram – Positive and Gram – Negative organism isolate such as staphylococci species and *pseudomonas species* were 100% sensitive to the to the ciprofloxacin and ofloxacin while it was least sensitive to cotrimoxazole.

Table 5 shows the antibiotic susceptibility pattern to Negative antibiotic discs. It was found that gram – positive and gram – negative organism isolated such as *staphylococci species* and *pseudomonas species* were sensitive to ciprofloxacin, ofloxacin and pefloxacin, while it was least sensitive to augmentin and gentamycin.

Table 1 Show the Numbers of Isolates and Sex

Samples	No. Of Isolates	Sex
1.	A1	F
	A2	F
	A3	F
2.	B1	F
	B2	F
	B3	F
3.	C1	M
	C2	M

	C3	M
4.	D1	M
	D2	M
	D3	M
5.	E1	F
	E2	F
	E3	F
6.	F1	F
	F2	F
	F3	F
Total	18	

F – Female

M – Male

Table 2: Zones of Inhibition by Positive Antibiotic Sensitivity Disc

No. of Plates	Antibiotic Discs									
	AMX	OFL	STR	CHL	CEF	GEN	PEF	COT	CPX	ERY
1.	12	24	26	0	0	0	22	0	30	16
2.	0	18	18	0	0	0	10	0	22	0
3.	0	20	0	0	0	0	14	0	36	0
4.	0	28	28	0	0	0	20	0	30	0
5.	22	22	24	0	0	0	18	0	32	0
6.	0	24	0	10	0	0	16	0	26	0
7.	0	0	0	0	0	0	0	0	20	0
8.	0	30	34	0	0	0	24	0	26	0
9.	0	24	20	0	0	30	20	0	32	0
10.	0	22	0	0	0	0	20	0	30	0
11.	22	30	22	0	0	0	0	0	26	0
12.	0	24	0	0	0	0	32	26	30	0
13.	0	24	18	0	0	0	20	20	28	0
14.	0	26	0	0	0	0	28	18	32	26
15.	0	32	0	0	0	0	28	0	26	0
16.	0	28	0	0	0	18	30	0	34	0
17.	0	30	0	20	0	0	34	020	32	24
18.	0	28	0	0	0	0	24	20	30	0
Total	56	434	190	30	0	62	360	104	522	66

AMX – Amoxicillin 25mcg; OFL – Ofloxacin 5mcg; STR – Streptomycin 10mcg; CHL – Chloramphenicol 30mcg; CEF – Cotriazone 30mcg; GEN – Gentamycin 10mcg; PEF – Pefloxacin 5mcg; COT – Cotriomoxazole 25mcg; CPX – Ciprofloxacin 10mcg; ERY – 5mcg

Table 3: Zones of Inhibition by Negative Antibiotic Sensitivity Discs

No. of Plates	Antibiotic Discs Zones of inhibition in (mm)									
	AUG	CRO	NIT	GEN	COT	OFL	AMX	CPX	TET	PFX
1.	0	0	0	0	20	22	0	24	0	24
2.	0	0	0	0	0	28	0	28	0	28
3.	0	0	0	0	0	20	0	30	0	18
4.	0	0	0	0	0	24	0	34	0	22
5.	0	18	0	0	0	20	0	34	28	28
6.	0	0	0	0	0	16	0	34	0	26
7.	0	0	22	0	0	28	0	22	0	28
8.	0	0	0	0	0	20	0	30	0	20
9.	0	0	0	0	0	20	0	32	0	22
10.	0	0	0	0	0	26	0	22	0	22
11.	0	0	0	0	0	18	9	24	0	22
12.	0	0	0	0	0	24	0	26	0	12
13.	0	0	0	0	0	26	0	36	22	28
14.	0	0	0	0	0	12	12	32	0	22
15.	0	0	0	0	0	28	0	32	0	30
16.	0	0	0	0	0	14	10	28	0	18
17.	0	0	0	0	0	30	10	18	24	32
18.	0	0	0	0	0	28	0	24	24	18
Total	0	18	22	0	20	402	22	510	106	402

AUG – Augmentin 30mcg; CRO – Ceftriazone 30mcg; NIT – Nitrofuranton 200mcg; GEN – Gentamycin 10mcg; COT – Cotriomoxazole 25mcg; OFL – Ofloxacin 5mcg; AMX Amoxycillin 25mcg; TET – Tetracycline 30mmcg; CPX – Ciproflooxacin 10mcg; PFX – Pefloxacin 5mcg

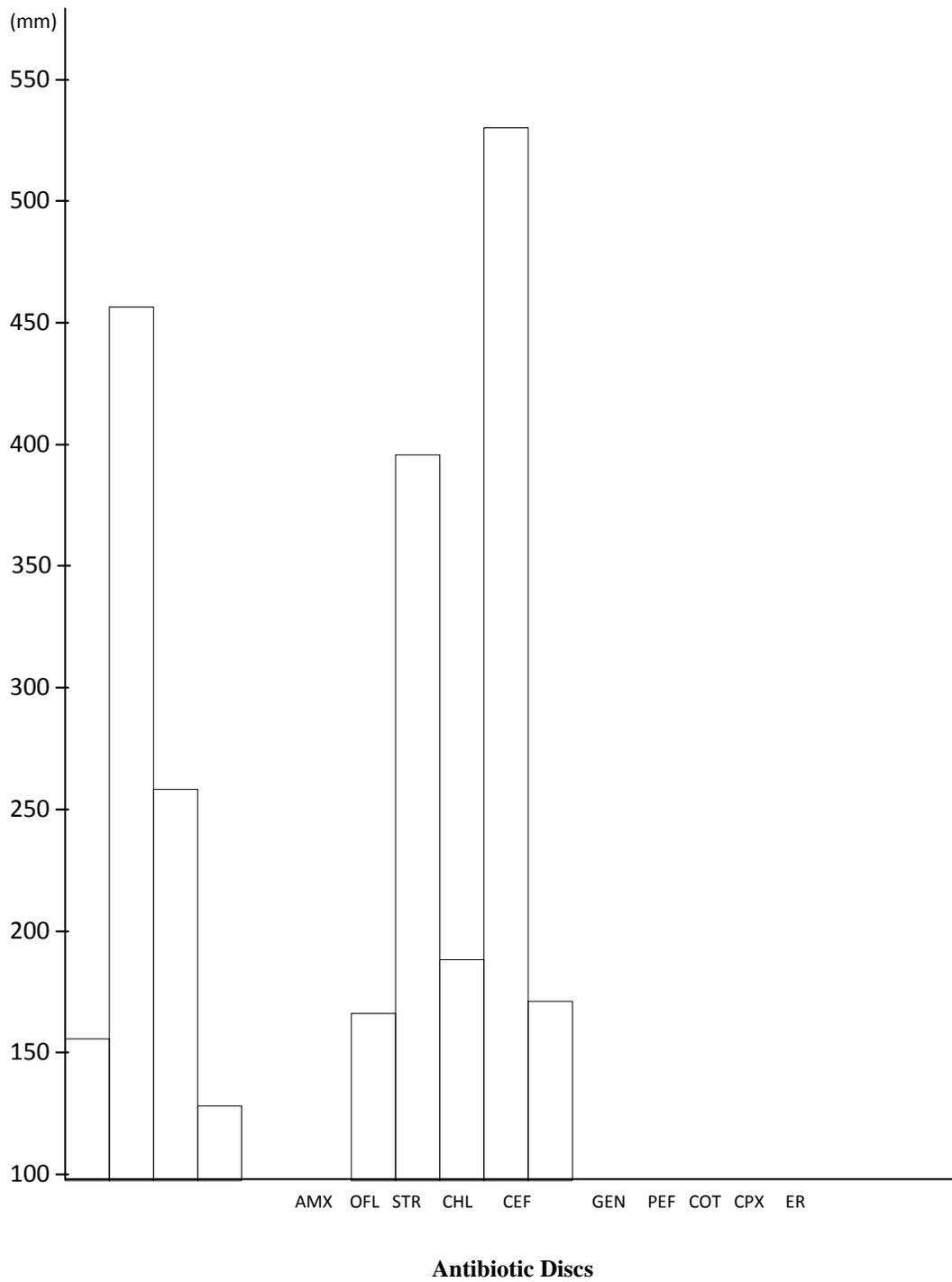


Figure 1: Illustrates the Graphical Representation of Zone of Inhibition by Positive Antibiotic Sensitivity

Discs

Table 4: Antibiotic Susceptibility Pattern from Positive Antibiotics Discs in Percent

Antibiotics Discs	No. of Isolates	No. of Sensitive in (%)	No. of Intermediate In (%)	No. of Resistance in (%)
Amoxicillin	18	16.7	0.0	5.6
Ofloxacin	18	94.4	0.0	5.6
Streptomycin	18	50.0	0.0	0.0
Chloramphenicol	18	5.6	0.0	94.4
Ceftriazone	18	0.0	5.6	94.4
Gentamycin	18	16.7	0.0	77.4
Pefloxacin	18	17.2	0.0	16.7
Cotrimoxazole	18	27.8	0.0	72.2
Ciprofloxacin	18	100.0	5.6	0.0
Erythromycin	18	5.6	0.0	89.0

Table 5: Antibiotic Susceptibility Pattern From Negative Antibiotic Discs Plates

Antibiotic Discs	Nos. Of Isolate	No. of Sensitive In (%)	No. Of Intermediate In (%)	No. Of Resistance In (%)
Augmentin	18	0.0	0.0	100.0
Ceftiazone	18	5.6	0.0	94.4
Nitrofurantoin	18	2.2	0.0	77.8
Gentamycin	18	0.0	0.0	100.0
Cotrimozazole	18	5.6	5.6	94.4
Ofloxacin	18	88.8	0.0	5.6
Amoxicillin	18	0.0	0.0	100
Ciprofloxacin	18	94.4	5.6	0.0
Tetracycline	18	22.2	0.0	77.8
Pefloxacin	18	94.4	0.0	5.6

DISCUSSION

This study reveals the pattern of the antibiotics susceptibility of bacteria isolated from the Ear discharge. The use of antimicrobial drugs is often essential and indeed sometimes mandatory in order to achieve desired therapeutic objectives or to treat co-existing diseases [10]. The Microbes causing the diseases may either be sensitive or resistant to the Drugs. Bacteria were isolated in 80% of ear with acute otitis externa in this study and these organisms were parable to the study done by [11] which reported *Pseudomonas aeruginosa* as the commonest organisms followed by *Staphylococcus aureus*. However, [3] isolated *Staphylococcus aureus* as the commonest isolate followed by *Pseudomonas aeruginosa* and *Streptococcus pyrogenes*. In a study by [12] on 124 patients clinically diagnosed as infections otitis External found *Staphylococcus aureus* and *Pseudomonas aeruginosa* with equal frequency. Other organisms isolated in their study were *Proteus* sp., *Klebsiella* sp and *Escherichia coli*. Furthermore, this study reveals the females were affected slightly more frequent than males. [4] also found that females were more frequently affected than males [13] found that pain, itching, discharge, and hearing lose were the most common

present complain t in both acute and chronic otitis externa.

Acute otitis externa was found to affect more commonly the younger age group especially those below twenty years of age. Trauma to the external auditory canal by use of cotton tipped applicators were recognized as the most important predisposing factor for acute otitis externa patient with acute otitis externa are also associated with complaint of ear ache, itching, hearing loss, ear discharge, tinnitus and fever in descending order of frequency.

The antibiotic susceptibility test in this study shows that positive antibiotic disc used on gram-positive bacteria isolated were sensitive to ciproflaxcin (100%) and Chloramphenicol (94%). Similarly , the study reveal that negative antibiotic disc used don gram-negative bacteria isolated are sensitive to Ciprofloxacin (95%), Pefloxacin (94.4%) and Ofloxacin (89%). Also gram-negative bacteria isolated are resistant to Agumentin (100%) and Gentamycin (99%). [12] also found that majority of organisms isolated from infections Otitis externa were resistant to trimoxazole, amoxicillin and erythromycin while 100% were sensitive to impenem and 92% were sensitive to ciprofloxacin and ofloxacin. In conclusion, it is obvious that ciprofloxacin is

the most sensitive to both gram- Positive and gram negative bacteria isolated followed by ofloxacin and pefloxacin. However ciprofloxacin can be used empirically for the treatment of acute infections otitis externa (ear discharge); and the susceptibility will cover both isolated gram-positive and Gram-negative bacteria respectively.

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