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RESEARCH ARTICLE

Antibiogram of Bacterial Species Isolated From Urinary Tract Infections patients in Najaf Governorate(Iraq) During 2012

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Abstract

hospital in Najf governorate during the period from Jan-December,2012. In which a total of 426 urine specimens were collected from out and in patient with urinary tract infection. 428 bacterial strains were isolated from UTI. *E.coli* (38%) was the commonest bacteria followed by *Klebsiella spp.* (21.1%) ,*Streptococcus spp.*(14.3%),*Staphylococcus spp.* (12.6%) ,*Enterobacter spp.*(5.3%),*Proteus spp.*(4.4%) ,*Pseudomonas spp.* (3.5%) and *Acinetobacter spp.*(0.9%). three peaks of *E.coli* incidence were obtained . The first one occurred in march and the second one in July ,and the third one in September. Over 50% of *E.coli* strains were resistant to CFM ,CTX and AMC , The strain of *Klebsiella spp.* Presented a high resistant to CTX (61.1%)and CFM(61.1%). The strain of *Enterobacter spp.* showed 52% resistant to CFM. The strain of *proteus spp.* showed 84.2% resistant to COT and low resistant to TMP 63.1% and GEN 47.3%. *Pseudomonas spp.*strains were 66.6%resistant to COT and 60%and 53.3%were resistant to AMC and CFM. Over 60%of *Staph.aureus* strains were resistant to CFM and CTX. the high resistant *Streptococcus spp.* to CFM. Fifty percent of *Acintobacter spp.* Strains presented resistant to AMC ,AK and NA . And 100%sensitive to CIP ,CTX,CTR,CRO and TOB

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This study was conducted into Al-hakkem general

Introduction:

Urinary tract infections (UTI) are among the most frequent bacterial infections encountered both in the outpatient units and in nosocomial infections. Urinary tract infections(UTIs) are a significant cause of morbidity and mortality world_wide.Although over 90% of UTIs are relatively Simple infections in anatomically normal patients and caused by Gram_negative bacteria in fecal origins [1]. They can involve any age group and are often followed by recurrences which increase the risk of long term kidney lesions. Urinary infections are frequently caused by Enterobacteria, E coli causes 70-95% of both upper and lower UTIs. The remainder of infections is composed of various organisms, including *S. saprophyticus*, *Proteus* species, *Klebsiella* species, *Enterococcus faecalis*, other Enterobacteriaceae, and yeast. Some species are more common in certain subgroups, such as *S. saprophyticus* in young women[2] .

Most complicated UTIs are nosocomial in origin. The most common pathogens include E coli, Enterococci, P aeruginosa, Candida species, and *Klebsiella pneumoniae*.Calculi related to UTIs most commonly occur in women

who experience recurrent UTIs with *Proteus*, *Pseudomonas*, and *Providencia* species. Patients with severe combined immunodeficiency (SCI) develop UTIs with microorganisms that form dense biofilms on the bladder wall; thus, these infections are difficult to eradicate. Organisms that commonly cause infections include *Proteus*, *Pseudomonas*, *Klebsiella*, *Serratia*, and *Providencia* species, along with enterococci and staphylococci. Approximately 70% of [In complicated UTIs, renal damage leading to kidney failure and death can occur. Bacteremia, Lower respiratory tract infections, Skin & Soft tissue infections, Endocarditis, Central Nervous System Infections, Bone and joint infections, and Ophthalmic infections[4].

The choice of the antibacterial treatment is based on the knowledge of the predominant pathogenic agents and of their susceptibility to chemotherapeutic agents. The selection and spreading of the strains resistant to the antibiotics is a clinical aspect of great importance in the present period, requiring the continual monitoring of this phenomenon [5 , 6].

This study analyses the results relating to the antimicrobial resistance of certain bacteria isolated in the outpatient unit from patients with UTI during January –December (2012) .

- Methods

- Patients and specimens collection

This study was conducted into Al-hakkem general hospital in Najf governorate during the period from Jan-December, 2012. In which a total of 426 urine specimens were collected from out and in patient with urinary tract infection. Specimens were collected with their medical record reviewed for each patients which including name, age, gender, address, and date of collection. (data from January –June obtained from hospital).

All specimens were incubated into macConkey agar, blood agar plates and incubated at 37c under aerobic conditions for 24 hours .

-Identification of bacteria

The bacteria identify according to the diagnostic producers recommended by [7 ,8]. The identification of bacteria as established according to the culture and morphological characteristic, including to the shape of colonies, lactose fermentation or non-lactose fermenter, appearance pigment production ...etc. Morphological & biochemical test include the :Direct microscopic examination, Catalase test, Oxidase test, Indole production test, MP.VP., Simmon citrate test, Triple sugar iron agar test, Urease production test.

-Antibiotic susceptibility test

The susceptibility test of *E.coli* was carried out against antibiotic using the disk diffusion method on MHA [1]. two- ml of brain heart infusion broth have been inoculated with an isolated colony of the test bacteria and incubated for 24 hours at 37c. After that, the turbidity of bacterial suspension has been adjusted turbidity of McFarland (0.5) standard tube. The resulting zone of inhibition have been measured by using a ruler and compared with zones of inhibition determined by [9], and to decide the susceptibility of bacteria to antimicrobial agent, whether being resistant or susceptible.

Antibiotic discs

Antibiotics	Symbol	Concentration (µg/disc)
Amikacin	AK	35
Amoxicillin	AMC	25
Ampicillin	AMP	10
Ceftraxone	CTR	30
Ceftrazin	CFM	30

Ceftriaxone	CRO	30
Cephalexin	CTX	30
Ciprofloxacin	CIP	5
Cotrimaxazoi	COT	30
Gentamycin	CN	10
Naledix acid	NA	30
Tobramycin	TOB	10
Trimethoprin	TMP	5

Results and Discussion

- Isolation and Prevalence of Bacteria

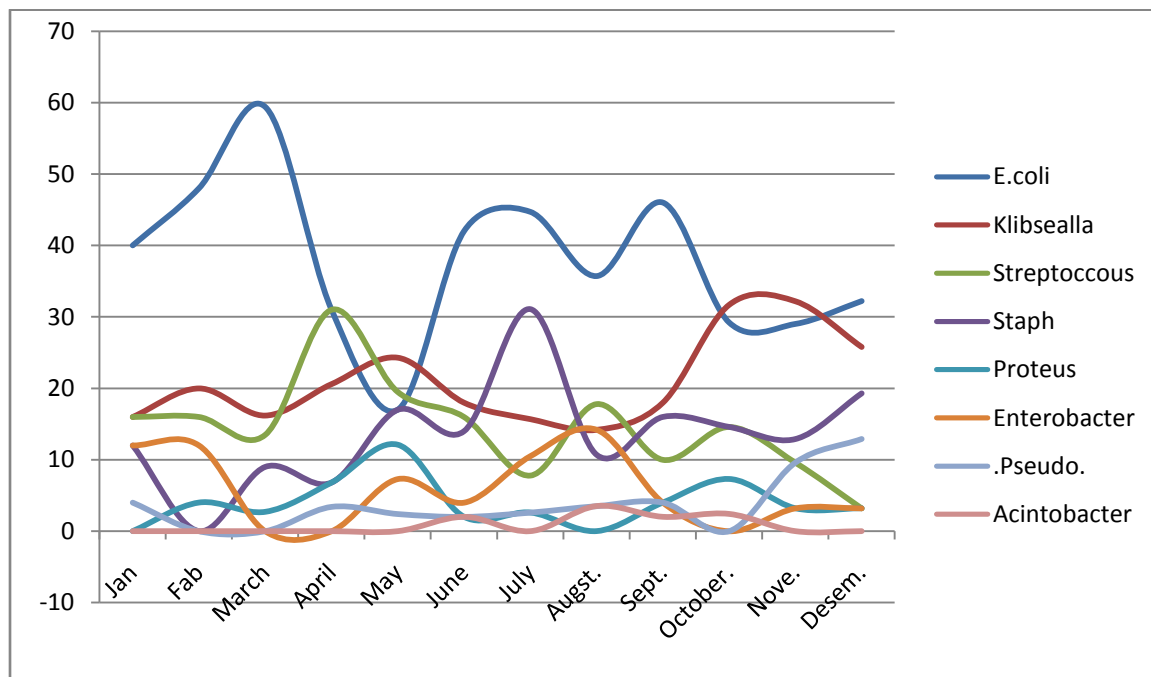
Out of 426 urine sample ,428 bacterial strains were isolated from UTI E.coli (38%) was the commonest bacteria followed by Klebsiella spp. (21.1%) ,Streptococcus spp.(14.3%),Staphylococcus spp. (12.6%) ,Enterobacter spp.(5.3%),Proteus spp.(4.4%) ,Pseudomonas spp. (3.5%) and Acinetobacter spp.(0.9%) as represented in table (1).

Table (1):Bacterial species isolated from UTI from June to December ,2012

Months	No.of samples	Isolates																	
		E.coli		Klibsealla spp.		Streptococcus spp.		Staph.aureus		Enterobacter spp.		Proteus spp.		Pseudomonas spp.		Acintobacter Ssp.			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Jan	25	10	40	4	16	4	16	3	12	3	12	0	0	1	4	0	0		
Fab	25	12	48	25	20	4	16	0	0	3	12	1	4	0	0	0	0		
March	37	22	59.4	6	16.2	5	13.5	3	9	0	0	1	2.7	0	0	0	0		
April	29	9	31	6	20.6	9	31	2	6.8	0	0	2	6.8	1	3.4	0	0		
May	41	7	17	10	24.3	8	19.5	7	17	3	7.3	5	12.1	1	2.4	0	0		
June	50	21	42	9	18	8	16	7	14	2	4	1	2	1	2	1	2		
July	38	17	44.7	6	15.7	3	7.8	5	31.1	4	10.5	2	2.6	1	2.6	0	0		
Augst.	28	10	35.7	4	14.2	5	17.8	3	10.7	4	14.2	0	0	1	3.5	1	3.5		
sept.	50	23	46	9	18	5	10	8	16	2	4	2	4	2	4	1	2		
Octoper.	41	12	29.2	13	31.7	6	14.6	6	14.6	0	0	3	7.3	0	0	1	2.4		
Nov.	31	9	29	10	32.2	3	9.6	4	12.9	1	3.2	1	3.2	3	9.6	0	0		
Dec.	31	10	32.2	8	25.8	1	3.2	6	19.3	1	3.2	1	3.2	4	12.9	0	0		
Total	426	162	38	90	21.1	61	14.3	54	12.6	23	5.3	19	4.4	15	3.5	4	0.9		

Figure (1) show the distribution of bacterial species isolated from UTI according to the seasonal variations (12 months), in which the percentage of E.coli ,the most prevalent bacteria isolated in this study , appeared to be increase during January (40%)to march (59%) ,and then decrease from April (31%)to may (17%),while streptococcus spp .(31%)and klebsiella spp. (24.3%) were the commonest bacterial isolated during the two above month ,respectively . E.coli then represent the commonest bacterial isolated during June (42%), July (44.7%), August (35.7%), September (46%) and December(32.2%)while Klibsiella spp. Was the commonest bacterial isolated during October (31.7%) and November (32.2%) . In other word ,three peaks of E.coli incidence were obtained . The first one occurred in march and the second one in July ,and the third one in September.

Figure (1) show the distribution of bacterial species isolated from UTI according to seasonal variation



- Antibiotic Resistance

The standard disc diffusion method performed for the 162 strains of E.coli .Figure(2) show that over 50% of strains were resistant to CFM ,CTX and AMC ,a low rate of resistance was noted to COT ,TOB ,NA,GEN and TMP.

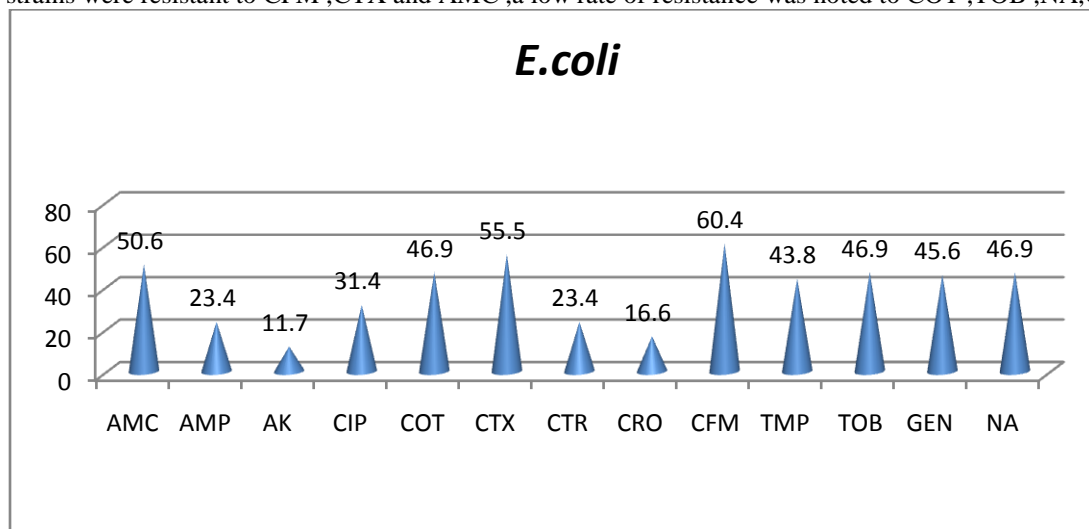


Figure (2) The antibiotic resistance of E.coli

The strain of Klebsiella spp. Presented a high resistant to CTX (61.1%)and CFM(61.1%) and a low resistant to AMC (45.5%),Cot(44.4%),and GEN(43.3%) as show in figure (3).

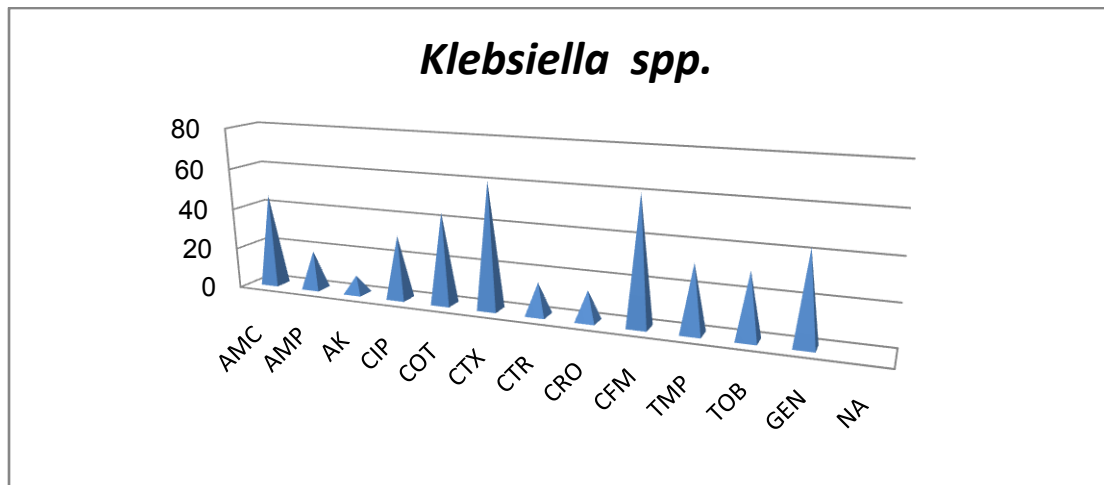


Figure (3)The antibiotic resistance of *Klebsiella spp.*

The strain of *Enterobacter spp.* showed 52% resistant to CFM and a very low percentage of resistant to AMC, NA and GEN (figure 4).

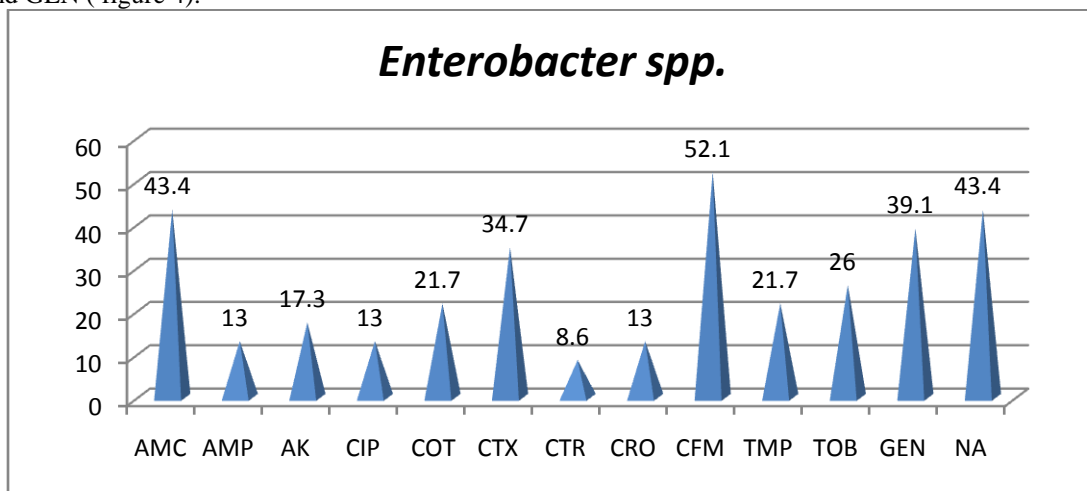


Figure (4)The antibiotic resistance of *Enterobacter spp.*

The strain of *proteus spp.* showed 84.2% resistant to COT and low resistant to TMP 63.1% and GEN 47.3% as in figure (5)

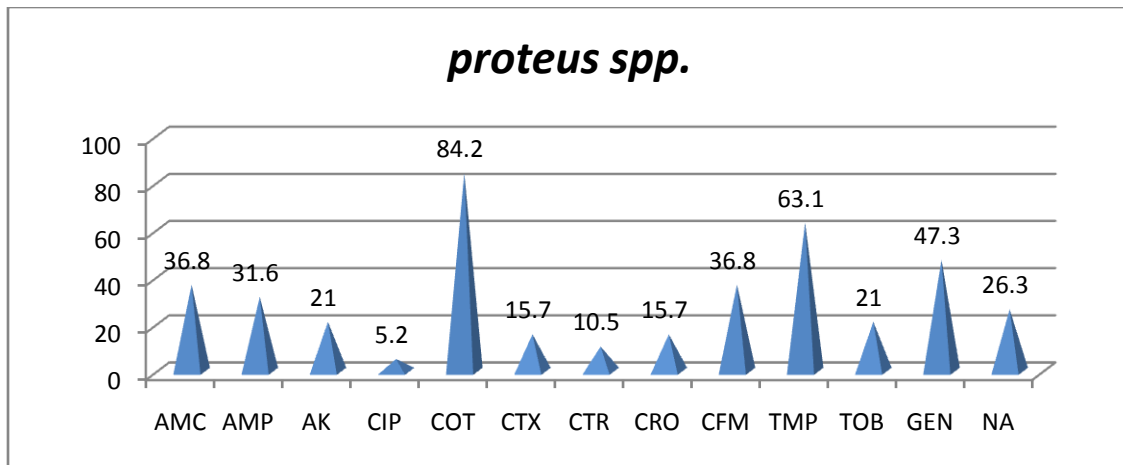


Figure (5) The antibiotic resistance of the proteus spp.

Pseudomonas spp. strains were 66.6% resistant to COT and 60% and 53.3% were resistant to AMC and CFM, respectively as in figure (6)

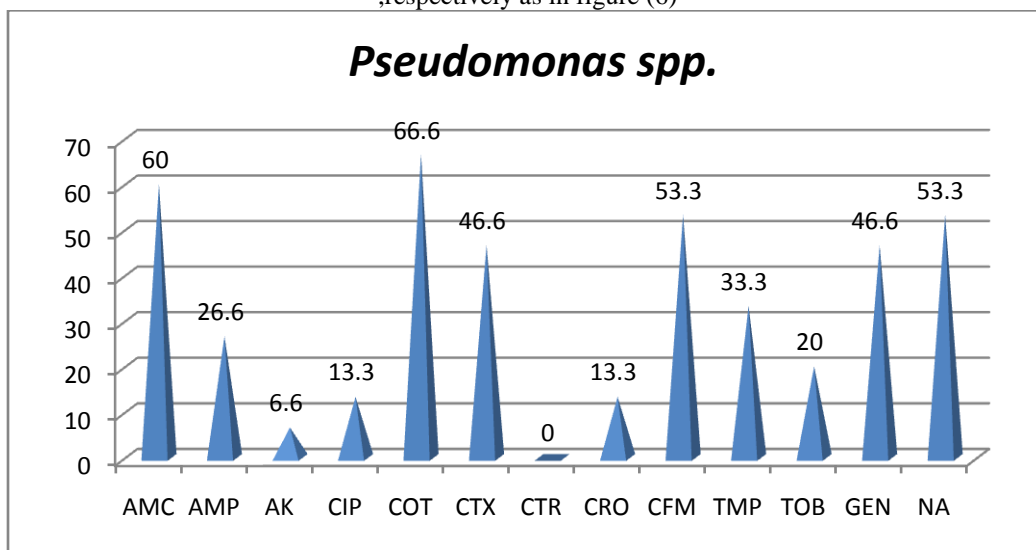


Figure (6) The antibiotic resistance of pseudomonas spp.

Over 60% of *Staph.aureus* strains were resistant to CFM and CTX show less resistant to other antibiotic used in this study as in figure (7).

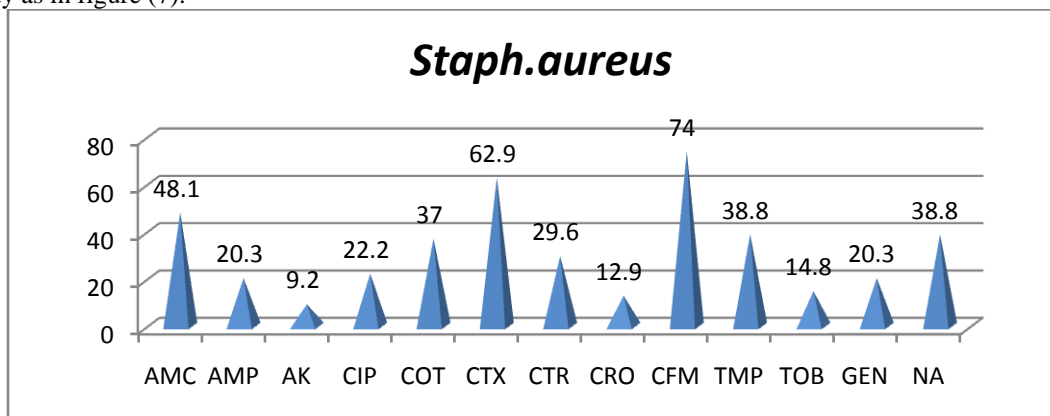


Figure (7) The antibiotic resistance of the Staph. aureus

Figure (8) show the high resistant Streptococcus spp. to CFM (65.5%) and a low rate of resistant to COT ,TMP and AK.

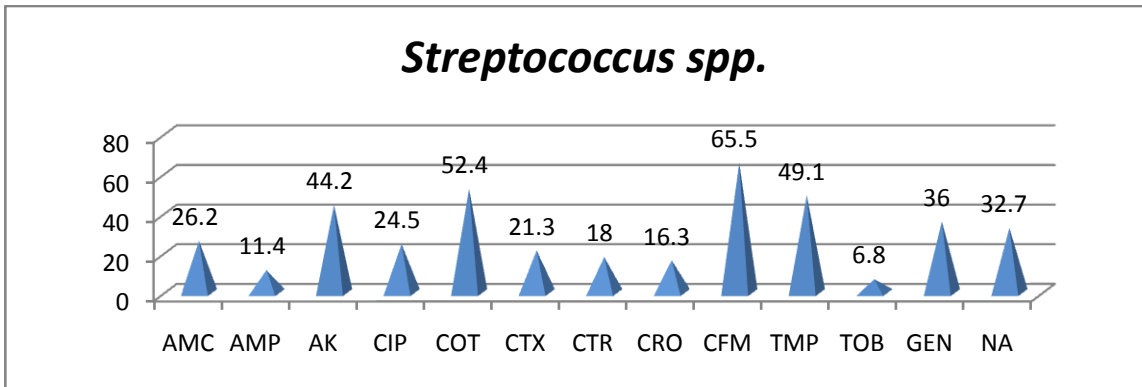
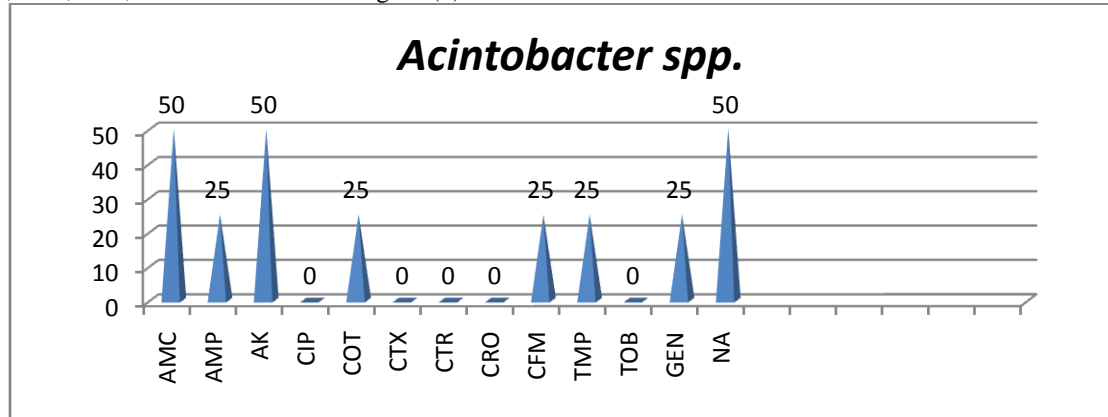


Figure (8) The antibiotic resistance of Streptococcus spp.

50% of Acinetobacter spp. Strains presented resistant to AMC ,AK and NA . And 100% sensitive to CIP ,CTX,CTR,CRO and TOB as in figure (9).



Figure(9) The antibiotic resistance of Acinetobacter spp.

Discussion

[10] isolated E.coli in 76.8% from UTI . Numerus other studies stated that E.coli occupies the first place in etiology of UTI [5,6] . The results of this study compatible with the results of [2] in which E.coli (66.7%)was the common bacterial from nosocomial UTI patients .

Of the 428 isolated strains ,21.1% of the strains were Klebsiella spp. ,the results obtained being similar to that found by [5] They found Klebsiella pneumoniae in 22% of the case as compared with a decreased percentage determined by [3].In this study ,other species of gram negative or gram positive bacteria (Enterobacter ,Acinetobacter ,proteus ,pseudomonas , staphylococcus .aureus and streptococcus) represented a small proportion of all isolated ,similarly with data reported by another study [11].

Most isolates (E. coli ,Enterobacter ,Klebsiella,staphylococcus ,streptococcus) were found resistant to CFM while ,COT is represent the highest antibiotic resistance by proteus spp. and Pseudomonas spp . in this study .

Trimethoprim _sulphamethaxazole (SXT) is the highest antibiotic resistance by Proteus spp. ,Klebsiella spp. and staphylococcus aureus in [3] study,While Ampicilin(AMP) is a highest drug resistant by E. coli in the above study . The Japanese authors consider that at present the important issues of UTI would be the increased incidence of ESBL-producing Gram-negative bacilli, their resistance to fluoroquinolones and the increased involvement of enterococci multiple resistant to chemotherapeutic agents . The fenomenon of antibiotic resistance requires a continual supervision for a better orientation of the treatment in UTI[12].

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