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A Study of Various Isolates from Urine Sample with their Antibiogram of C.C.M. Medical College & Hospital (2016-2017)

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Abstract
This research project is conducted between October 2016 To February 2017 in the Department of Microbiology, C.C.M. Medical College, Kachandur, Durg (C.G.). A total of randomly 100 urine samples received in the microbiology laboratory from the various wards. Out of 100 culture, 58 (58%) were gram negative bacilli, 21 (21%) were gram positive cocci and Mixed growths were seen in 21 (21%) cases. The most common organism isolated was E.coli (40%), Klebsiella sp.(6%),Citrobacter freundii (6%), Pseudomonas aeruginosa (1%),Proteus mirabilis (2%),Proteu vulgaris (1%), Enterococcus sp.(13%), Enterobacter sp.(2%), MRSA(3%), MSSA(2%),CONS(2%),Streptococcus sp.(1%),Mixed infections (21%).
Keywords: *Urine Samples, Gram negative bacilli isolates, Gram positive cocci isolates and antimicrobial sensitivity.*

Introduction

Urinary tract infection (UTIs) are cheracterized as being either upper (U-UTI) or lower (L-UTI) based primarily on the anatomic location of the infection .The lower urinary tract encompasses the bladder and urethra, and the upper urinary tract encompasses the ureters and kidneys .upper urinary tract infections affect the ureters (ureteritis) or the renal parenchyma (pyelonep-hritis) lower urinary tract infections may affect the urethra (urethritis), the bladder (cystitis), or the prostate in males (prostatitis). The hospital environment plays an important role in determining the organisms involved in UTIs. Hospitalized patients are most likely to be infected by E.coli, klebsiella spp, proteus spp, staphylo-cocci, other Enterobacteriaceae, pseudomonas aeruginosa, Enterococci, and candida spp. This microorganisms are the concealed enemies to the mankind and cause a very profound damage in human body as well as other living organism. The agents, which have the capacity to kill the microbes or arrest the multiplication, are called the antimicrobial agents or drugs.

Material and Methods

A Total of 100 urine sample were collected from various words of C.C.M. medical college and hospital.(CCMSU) Clean - catch mid stream urine should be collected in a wide mouth screw capped sterile container or, catheter tube or, syringe and it was labelled with the patients name, age, sex, etc.
Sample processing: Urine sample should be inoculated on to MacConkey agar, Blood agar and CLED (cysteine lactose electrolyte deficient) agar. It was incubated at 37^{O} C for 24-48 hours.

Observe the growth if there was no growth on MA,BA &CLED. A count of 10^5 colony forming units(cfu)/ml of urine is considered as significant-indicates infection(referred to as significant bacteriuria). The coloneal morphology and identification was done by Gram stain procedure and Biochemical tests applied were standard Catalase test, Bile esculin test, Coagulase test, Indole test, Methyle red test, Citrate test, Urease test, Oxidase test, Motility test, Carbohydrate fermentation test using Glucose, Sucrose, Maltose and Lactose.

Antibiogram Testing

Antimicrobial susceptibility testing of isolates was performed by standard Kirby Bauer disc diffusion methods according to CLSI protocol. Depending on the isolate, antibiotic discs were selected from among the following: Ampicillin(10 µg), Co-trimaxazol (25µg), Gentamicin(10 µg), Oxacillin (1µg), Erythromycin (15µg), Norfloxacin(10 µg), Nitrofurantoin (300 µg), Linezolid (30µg), Vanc-omycin (30 µg), Teicoplanin(30µg), Amikacin (30µg), Imipenem (10µg), Pipercilline (100µg), Ciprofloxacin (5µg), Ofloxacin(5µg).

The antibiogram testing was done as per as CLSI guidelines using modified Kirbey-Bauer method. Few colonies from the culture plate were inoculated into 2ml of peptone water. Incubated at 37^0c for 2 hrs. A cotton swab was immersed and rotated in this inoculums, the swab was then pressed to the side of the tube so as to remove excess inoculums. It was then used for carpet streaking on Mueller Hinton agar plate. The required antibiotic discs were then placed aseptically on this medium using sterile forecep. The plate was then incubated 24 hrs at 37^0c Next day the zone size was recorded and repotted as sensitive or resistant by comparing the zone size to the Kirby-bauer chart.

Results

A total of hundred Urine samples were received in microbiology laboratory of various wards from October 2016 to February 2017. Number of cases falls in the age group 0-10 years (10%), 10-25 years (15%), 25-45 years (40%) and 45 years above (35%). In our present study females were more affected 60 (60%) than males 40 (40%). Out of 100 culture, 58% were gram negative, 21% were gram positive. Mixed growth was seen in 21% cases. Following tables are showing results:

Table 1 Incidence of the monomicrobial isolates in the present study :

S.NO.	Organisms	No.of organisms	Percentage(%)(n=100)
1	E.coli	40	40%
2	Klebsiella spp.	6	6%
3	Citrobacter freundii	6	6%
4	P.aeruginosa	1	1%
5	Proteus mirabilis	2	2%
6	Proteus vulgaris	1	1%
7	Enterococcus spp.	13	13%
8	Enterobacter spp.	2	2%
9	MRSA	3	3%
10	MSSA	2	2%
11	CONS	2	2%
12	Streptococcus spp.	1	1%
13	Mixed infection	21	21%
		Total 100	100%

Table 2 Incidence of polymicrobial isolates

S.NO.	Mixed isolates	No.of cases	Percentage(%)
1	MSSA+P.aeruginosa	10	10%
2	E.coli+P.aeruginosa	5	5%
3	Klebsiella sp.+P.aeruginosa	3	3%
4	Citrobacter freundii+Klebsiella sp.	3	3%
	Total	21	21%

Table 3 Antibiotic sensitivity patternn of gram positive organism (Monomicrobial isolates)

S.NO.	Organism	NO.	OX		PEN		CZ		NOR		VAN		TEI		LZ		GEN		COT	
			R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S
1	MRSA	3	3	–	3	–	2	1	3	–	–	3	1	2	1	2	2	1	3	–
2	MSSA	2	–	2	1	1	–	2	2	–	–	2	–	2	–	2	2	–	1	1
3	CONS	2	2	–	2	–	2	–	2	–	–	2	–	2	–	2	2	–	2	–
4	Streptococcus spp.	1	–	–	1	–	–	–	1	–	–	1	–	1	–	1	–	1	–	–
5	Enterococcus spp.	13	–	–	9	4	–	–	11	2	–	13	–	13	–	13	11	2	12	1

Table 4 Antibiotic sensitivity pattern of gram negative organisms (monomicrobial isolates)

S.NO.	Organism	NO.	AMP		COT		GEN		OF		NOR		NIT		AK		CIP		CTX		IMP		PTZ		PI	
			R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S
1	E.coli	40	38	2	28	12	16	24	-	3	-	5	-	30	-	28	-	2	-	4	-	35	-	16	-	-
2	Klebsiella spp.	6	6	-	-	2	-	4	-	2	-	2	6	-	-	5	6	-	-	1	-	5	-	2	-	-
3	Citrobacter freundii	6	6	-	-	1	-	2	6	-	-	2	-	2	-	2	6	-	6	-	-	6	-	5	-	-
4	Proteus mirabilis	2	1	1	2	-	-	2	-	2	-	1	2	-	-	2	-	1	-	1	-	2	-	2	-	-
5	Proteus vulgaris	1	1	-	1	-	-	1	-	1	1	-	1	-	-	1	1	-	-	1	-	1	-	1	-	-
6	Enterobacter spp.	2	2	-	2	-	-	2	-	1	-	-	-	-	-	2	2	-	1	1	-	2	-	2	-	-

Table 5 Antibiotic sensitivity pattern for Pseudomonas aeruginosa

S.NO.	Organism	NO.	AMP		GEN		NIT		IMP		CIP		OF		CAZ		AK		PIT	
			R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S
1	P.aeruginosa	1	1	-	-	1	-	1	-	1	1	-	1	-	1	-	-	1	1	-

Table 6 Antibiotic sensitivity pattern of Poly microbial isolates

S.N	Organism	NO.	AMP		COT		GEN		OX		E		NX		NIT		OF		CIP		LZ		VA		TEI		CTX		IMP		PTZ	
			R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S
1	MSSA+P.aeruginosa	10	5	5	8	2	9	1	-	10	4	6	-	-	-	-	-	-	-	-	-	10	-	10	1	9	7	3	-	-	-	-
			8	2	-	-	5	5	-	-	-	-	-	-	1	9	2	8	4	6	-	-	-	-	-	-	-	-	-	10	6	4
2	E.coli+P.aeruginosa	5	2	3	1	4	3	2	-	-	-	-	1	4	-	5	1	4	-	5	-	-	-	-	-	-	3	2	-	5	4	1
			-	5	3	2	2	3	-	-	-	-	1	4	-	5	4	1	2	3	-	-	-	-	-	-	4	1	1	4	2	3
3	Klebsiella spp.+P.aeruginosa	3	1	2	-	3	2	1	-	-	-	-	1	2	-	3	-	3	-	3	-	-	-	-	-	-	1	2	-	3	1	2
			3	-	1	2	3	-	-	-	-	-	1	2	-	3	1	2	2	1	-	-	-	-	-	-	-	3	2	1	1	2
4	Citrobacter freundii+Klebsiella spp.	3	2	1	1	2	3	-	-	-	-	-	1	2	2	1	1	2	-	3	-	-	-	-	-	-	1	2	-	3	1	2
			1	2	-	3	1	2	-	-	-	-	2	1	-	3	-	3	1	2	-	-	-	-	-	-	-	3	-	3	2	1

Discussion

This research project conducted between October 2016 to February 2017. During this period, it is observed that 100 positive cases received in the microbiology laboratory from the various wards. this 100 positive cases, 60% females and 40% males .most positive cases were found under the age-group 25-45 years.

The most common organism isolated was E.coli (40%), Klebsiella spp.(6%), Citrobacter freundii (6%), Pseudomonas aeruginosa (1%),Proteus mirabilis (2%),Proteus vulgaris (1%), Enterococcus spp. (13%), Enterobacter spp.(2%), MRSA(3%), MSSA(2%), CONS(2%), Streptococcus spp. (1%), Mixed infections (21%).

Conclusion

This study revealed the presence of urine infection causing bacteria, those are capable of causing various human illness. It is concluded that gram-negative bacilli (Enterobacteriaceae) were responsible for urinary tract infections and most of the strains were multi-drugs resistant. The most common isolated bacteria from urinary tract infections was E.coli.

Antimicrobial susceptibility of microorganisms varies from time to time and from place to place. Hence regular monitoring of bacterial susceptibility to antibiotics is essential. Antibiograms should be prepared regularly and made readily available to the clinicians to guide them in therapy. There is a need for a central database in india where various laboratories can upload their antibiogram regularly and this data can be very useful in formulating guidelines for treatment of various infectious diseases.

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