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EVALUATION OF BACTERIOLOGICAL PROFILE OF URINARY TRACT INFECTION IN SAVEETHA MEDICAL COLLEGE HOSPITAL, CHENNAI.

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ABSTRACT

AIM : To evaluate the bacteriological profile of Urinary Tract Infection in Saveetha Medical College Hospital, Chennai.

INTRODUCTION : UTI are among the most common reasons for patients to seek medical advice. The incidence of UTI is common in females. The most common uropathogen is Escherichia coli.

MATERIALS AND METHODS : 197 patients were diagnosed with UTI .Urine samples of these patients were collected, processed, examined microscopically and positive cultures were tested .

RESULTS : Out of 197 samples, isolates were detected in 143 samples. 127 were from females and 16 were from males. The commonest organism found was Escherichia coli. The antibiotic susceptibility test was performed.

CONCLUSION : UTI are more common in females than in males. Escherichia coli was the most commonly isolated organism in UTI followed by Klebsiella spp . The most sensitive antibiotic was Amikacin . The most resistant antibiotics were Ampicillin .

KEYWORDS :

INTRODUCTION :

Urinary Tract Infection is one of the most common infection causing most morbidity and mortality in human population. The incidence is age related with three peaks. The first peak is in the early years of life, the second, much higher peak, is in women during the sexually active and child bearing years, and the third peak is in the later decades of life in men due to urethral obstruction like prostate enlargement and in females due to distal urethral syndrome. In women sometimes the bacterias that cause the Urinary Tract Infection are the same as the colonizing facial organisms in the vaginal introitus. Urinary Tract Infection is common in females due to their shorter and wider urethra.

The most common pathogen causing Urinary Tract Infection is *Escherichia coli* which accounts for more than 80% of positive culture. *Escherichia coli* is followed by other Gram Negative bacilli like Klebsiella spp, Proteus spp, Pseudomonas spp and Gram Positive bacilli like S.aureus and Enterococcus spp.

The inappropriate use of antibiotics has resulted in the development of antibiotic resistance and it has caused a reevaluation of the antimicrobial agents of choice in the Treatment of Urinary Tract Infection. Hospital acquired Urinary Tract Infection has also become a problem now a days.

The present study was planned to identify the uropathogens causing Urinary Tract Infection and to determine the antibiotic susceptibility pattern of them.

MATERIALS AND METHODS :

This study was conducted in the Department of Microbiology, Saveetha Medical College, Chennai over the period of six months from 1st July 2018 to 31st December 2018. This study included 197 patients who were treated in the department of urology, Saveetha Medical College Hospital, Chennai. These patients include both inpatients and outpatients and were diagnosed to be suffering from Urinary Tract Infection and these patients had the symptoms of Urinary Tract Infection such as burning micturition dysuria, haematuria, fever etc.,

These patients included both males and females between the age group of 15 years to 76 years Urine samples of these 197 patients were tested for cultures and all the positive cultures were tested for antibiotic sensitivity.

Collection of Urine Samples

Patients were provided with sterile wide mouthed screw capped container and they were advised to collect early morning midstream urine. The urine samples were properely labelled with the patient's particulars like Name, Age, Sex and Time of collection along with the patient's requisition form. The samples were analyzed and processed according to the standard protocol.

Sample Processing :

Culture : A calibrated sterile micron wire loop for the semi-quantitative method was used for the plating and it has a 4.0 mm diameter designed to deliver 0.01ml. A loopful of the well mixed urine sample was inoculated into duplicate plates of Blood and Mac-Cockey agar. All plates were then incubated at 37° C aerobically for 24 hours. The plates were then examined macroscopically and microscopically for bacterial growth. The bacterial columns were counted and multiplied by 100 to give an estimate of the number of bacteria present per milliliter of urine. A significant bacterial count was taken as any count equal to or in excess of 10,000cfu/ml.

Microscopy :

The urine samples were mixed and aliquots centrifuged at 5000 rpm for 5 min. The deposits were examined using both 10X and 40X objectives. Samples with > 10 white blood cells/mm3 were regarded as pyuric. A volume of the urine samples were applied to a glass microscope slide, allowed to air dry, stained with gram stain, and examined microscopically. Bacterial isolates were identified generally using biochemical reaction.

Antibiotic susceptibility testing :

The method used with standardization of the inoculums size was agar diffusion method. The standardized single-disc diffusion method was employed.

RESULTS :

In this study urine samples of 197 patients who were clinically diagnosed with Urinary Tract Infection were collected and tested for microorganisms and antibiotic sensitivity

Table No.1 Gender wise distribution of the Urine Culture of UTI Patients

Gender	Positive Samples	Negative Samples	Total Samples
Male	16 (8.12%)	43 (21.84%)	59 (29.94%)
Female	127 (64.46%)	11 (5.58%)	138 (70.05%)
Total	143 (72.58%)	54 (29.41%)	197

- Out of the 197 patients 59 (29.94%) patients were Male and 138 (70.05%) patients were Female.
- Out of the total 197 samples isolates were detected in 143 (72.58%) samples and non detected in 54 (29.41%) samples
- Out of the positive 143 samples 127 were from Females and 16 from Males
- The overall prevalence of UTI in this study population of 72.58%.
- Females 127(64.46%) showed a higher prevalence as compared to Males 16(8.12%)

Table No. 2 Gender wise distribution of Various Urinary Pathogens (N= 143)

Isolates	Infected Male (%)	Infected Female (%)	Total
E.Coli	9 (6.29 %)	81 (56.64%)	90 (62.93%)
Klebsiella spp.	3 (2.09 %)	12 (8.39 %)	15 (10.48%)
Proteus	1 (0.69 %)	8 (5.59 %)	9 (6.29 %)
Pseudomonas	1 (0.69 %)	6 (4.19 %)	7 (4.88 %)
S.aureus	1 (0.69 %)	4 (2.79 %)	5 (3.49 %)
Enterococcus	-	7 (4.88 %)	7 (4.88 %)
Candida spp.	1 (0.69 %)	6 (4.19 %)	7 (4.88 %)
Others	-	3 (2.09 %)	3 (2.09 %)
Total	16	127	143

- Most common pathogen found positive was E.coli.
- Out of the 143 positive samples E.coli was found positive in 90 (62.93%) samples
- Out of these 90 samples 81 (56.64%) were females and 9 (6.29 %) were males
- Klebsiella spp. was found in 15 (10.48%) samples, Proteus in 9 (6.29%) samples, Pseudomonas 7 (4.88%) samples, S.aureus in 5 (3.49%) samples, Enterococcus in 7(4.88%) samples, and Candida spp in 7 (4.88%) samples.

Table : 3 Antibiotic sensitivity pattern of isolated uropathogens

Antibiotic	E.coli *n=90*	Klebsiella sap. *n=15*	Proteus *n=9*	Pseudomonas *n=7*	S. aureus *n=5*	Enterococcus *n=7*
Amikacin	81	62	67	69	72	66
Netilmycin	69	56	60			
Gentamycin	70	57	62			
Ampicillin Sulbactum	50	42		62		38
Piperacillin Tazobactum	72	60	72	82		
Cefuroxime	52	56	59	48	26	
Cefixime	50	48	56	32	30	
Cefeperazone Salbactum	62	70	52	72		
Levofloxacin	68	72	80	72		36
Ofloxacin	60	52	48	39		
Nitrofurantoin	76	70	74	78	68	86
Imipenem	76	82	32	62	78	46
Meropenem	69	60	65	64	50	
Linezolid	64			86	84	62
Cefepime	62	70	52	72		

- In case of E.coli Amikacin showed the highest sensitivity followed by Nitrofurantoin, Imipenem, Piperacillin Tazobactum, Livofloxacin and Cefepime. Ampicillin showed the highest resistance.
- In case of Klebsiella spp. Imipenem showed the highest sensitivity followed by Cefeperazone, Amikacin and Piperacillin Tazobactum, Ampicillin showed the highest resistance.
- In case of Proteus Levofloxacin showed the highest sensitivity followed by Nitrofurantoin, and Piperacillin Tazobactum.
- In case of Pseudomonas, Piperacillin Tazobactum showed the highest sensitivity followed by Linezolid and Cefepime.
- In case of S.aureus, Linezolid showed the highest sensitivity followed by Amikacin.
- In case of Enterococcus, Nitrofurantoin showed the highest sensitivity followed by Linezolid and Amikacin.

DISCUSSION :

The prevalence of Urinary Tract Infection in the study population was 72.58%. In this study the prevalence of UTI in Females 127 (64.46%) is more than in males 16 (8.12%). This correlates to the findings of Aruna K et al and Acharya et al who also reported high prevalence of UTI in females than males. The women are more prone to UTI than men because in females the urethra is much shorter and closer to the anus.

The most common uropathogens isolated in this study population were E.coli 62.93%. The next most common pathogens was Klebsiella spp. 10.48%. The other pathogens were Proteus 6.29% Pseudomonas 4.88% and S.aureus 3.49%.

The most effective antibiotics against the gram negative E.coli in this study was Amikacin and the other sensitive antibiotics were Nitrofurantoin, Piperacillin Tazobactum, Cefepime, Levofloxacin, Imipenem and Linezolid. The most effective antibiotics against gram positive organism were Nitrofurantoin, Linezolid and Amikacin.

The present study suggests that Amikacin, Levofloxacin and Nitrofurantoin may be used for empirical therapy against UTI before the Culture and Sensitivity results are available. These three drugs have good sensitivity against both gram negative and gram positive organism. All the frequently isolated pathogens showed resistance to the commonly used antibiotics like Ampicillin, Norfloxacin and Nalidixic acid.

CONCLUSION :

Urinary Tract Infection was more common among the females than in the males and UTI occur in women of all ages and most frequently seen during the sexually active years and in older post menopausal women. E.coli was the most commonly isolated organism in UTI followed by Klebsiella and Pseudomonas.

The most sensitive antibiotic was Amikacin followed by Nitrofurantoin, Imipenem, Piperacillin Tazobactum, Linezolid and Cefepime. The most resistant antibiotics were Ampicillin and Nalidixic acid. Antimicrobial resistance have caused a reevaluation of the antimicrobial agents of choice in the treatment of Urinary Tract Infection. Hospital acquired Urinary Tract Infection has also become a concern at present.

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