

Antimicrobial Susceptibility Pattern of Uropathogens

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ABSTRACT

Urinary Tract Infections (UTIs) are prominent amongst the most widely recognized bacterial infections in people, both in the group and the health care facility settings. UTIs are amongst the most common uncontrolled infections influencing roughly 150 million individuals around the world. Urinary Tract Infections (UTIs) are the most pervasive contaminations overall both in males and females. We gathered 360 urine tests from July to September 2015, 104 from males and 156 from females. This outcome was clear that *E. coli* was the dominating pathogen (82%) causing UTI. These microorganisms additionally produce chemicals called Extended Spectrum Beta Lactamases (ESBL) which render cephalosporins resistance. Anti-microbial susceptibility test was examined by plate dissemination strategy utilizing distinctive anti-microbials and their zone of inhibition was measured. In this study it was found that *E.coli* indicated most noteworthy organisms resistant to Ampicillin (92.6%) to Ciprofloxacin (95%) and is just mild to Amikacin (74.1%). *Klebsiella* likewise demonstrates 100% resistivity to the Ampicillin while *P. aeruginosa* was extremely mild to Amikacin (78.94%), Fosfomycin (78.94%) and Noroxin (73.68%). The present study was assessed for the predominance of micrograms involved in UTI to find out their antimicrobial resistance patterns and demonstrates rising multidrug resistance among UTI bacterial pathogens.

Keywords: Beta lactamases, *Escherichia coli*, urinary tract infection, uropathogen.

INTRODUCTION

Urinary tract infections (UTIs) are a standout amongst the most widely recognized bacterial diseases experienced by both general professionals and microbiologists. UTIs constitute one of the significant reasons for morbidity and mortality. Frequency of contamination is higher in females and 20.0-50.0% of whom, will endure no less than one clinical scene of UTI amid their life time (Leigh, 1990). It has been observed that in 7.0 % of children UTIs create renal scarring. It additionally has been observed that UTI in pregnancy might be connected with an expanded neonatal mortality and can likewise be a source of gram negative septicemia which every now and again demonstrates lethal implication. (Acharya and Jadav, 1980). The occurrence of contamination in urinary tract is altogether brought up in female as compared

to male. Almost fifty percent of females will have UTI in any event once in their life. The decision of treatment is subject to whether it is confused or uncomplicated (Sherifa *et al.*, 2011). *Escherichia coli* is the reason for about 80% of uncomplicated UTIs cases (Wang *et al.*, 2013; Carl, 2006). Next to *E. coli* other Gram negative bacteria included are “*Pseudomonas aeruginosa* *Klebsiella spp.*, *Enterobacter spp.*, and *Proteus spp.*”, While *Enterococcus spp.*, *Staphylococci* and *Streptococci* are among Gram positive bacteria are associated with UTI in 5 to 15% of the cases (Zareef *et al.*, 2009; Okonko *et al.*, 2009). The range of microscopic organisms required in UTIs which are additionally involved dominantly (Sherifa *et al.*, 2011).

UTI usually associated with these bacteria in various areas of the world, this susceptibility pattern additionally changes with time. The treatment decisions are principally taking into

account.

On the basis of local information of antimicrobial susceptibility. Lamentably it is observed that typically just confused UTIs are sent for culture thus the information for uncomplicated UTI is extremely insufficient (Carl, 2006; Okonko *et al.*, 2009; McNulty *et al.*, 2008).

Moreover UTI may prompt life threatening diseases like sepsis and renal scarring. Renal scarring is the most well-known reason for hypertension in later adolescence and renal failure in adulthood (Bickerton and Duckett, 1985; Chon *et al.*, 2001). Recognition of UTI in children ought to be made as ahead of schedule as could be expected under the circumstances to keep off these involvements (Chon *et al.*, 2001). Therefore, examinations for early determination of UTI are of out-most significance (Watson, 1988). No less than 80.0% of UTI in children is brought about by *Escherichia coli* and become threatening due to the involvement of different bacteria like *Proteus*, *Enterococcus*, *Pseudomonas*, *Klebsiella*, *Citrobacter* and *Staphylococcus species* (Watson, 1988).

Selection of antibiotic agents should be originated on antibiotic susceptibility pattern. Occasional assessment of antimicrobial activity of various anti-microbial is fundamental as the example of antibiotic sensitivity may fluctuate over brief periods (Jones and Thornsberry, 1984). Expanding of antibiotic resistance among urinary pathogens, particularly *E. coli*, to regularly recommended drugs like cotrimoxazole has turned into a worldwide authorized drug (Manges *et al.*, 2001). Utilization of anti-microbials by doctors is wild causing increase in resistance to available antimicrobial agents. Segregation of microorganisms bringing about UTI and their anti-microbial susceptibility is extremely vital for their proper administration (Gruneberg, 1981).

Appropriate antimicrobial treatment may diminish the potential for complications. Decision of suitable antimicrobials relies upon the information of basic microorganisms and their antimicrobial susceptibility pattern in local situation. Hopefully, this study will help the clinicians to get comfortable with the normal pathogens in charge of UTIs and their antimicrobial susceptibility patterns which certainly help the clinicians to pick the correct experimental antimicrobial administration of UTI (Acharya *et al.*, 2011).

This study meant to discover the bacterial pathogens, that are mostly associated with Urinary Tract Infections (UTI) alongside their antibiotic susceptibility in patients.

MATERIALS AND METHODS

Collection of sample: Data was collected 360 fresh urine cultures during time period July-September at the Citilab and Diagnostic Center from the all sex, age and genders except from pregnant women.

Clinical isolates: Urine was centrifuged and the sediment were used for microscopic examination.

First day session: A loopful of the well mixed urine sample was inoculated on plates of CLED and Mac-Conkey agars. All plates were incubated at 37°C aerobically for 24 hours. The colonies were examined microscopically further identified by biochemical test to determine the specie.

Next day session: Examine microscopically the colonies from CLED and MacConkey Agar were stained by gram staining and observed.

Antimicrobial susceptibility testing: The antimicrobial activity was determine by Ampicillin (AMP), Cephadrine (CE), Piperacillin (TZP), Cefuoxime (CXM), Cefexime (CFM), Amikacin (AK), Norfloxacin (NOR), Ciprofloxacin (CIP), Fosfomycin

(FOS), Pipemidic Acid (PIP). Antimicrobial susceptibility testing was determined by plate dissemination strategy.

RESULTS

In this study, total 360 fresh urine samples were collected out of 104 samples were collected from males and 256 samples were collected from females from the Citilab microbiology laboratory in Karachi. The results are classified according to the age group range of patients was between 1 and 60 years with a mean of 25.28 years. More isolates were recovered from females (56) as compared to males (36). The most common pathogen associated with UTI was *E. coli*, with other organisms forming

32% of all the isolates (Table I). We distributed them according to the age group (shown in Table III). The organisms are confirmed by performing IMVIC tests (Table II). Percentage of resistance to the antimicrobial agents among UTIs isolates (Table IV).

DISCUSSION

Over the time of 3 months from July 2015 to September 2015 at the CitiLab Karachi, we have gathered approximately 360 new urine tests in which 104 specimens were gathered from males and 256 examples from females then the specimens were disseminated by age group. Just 135 specimens were sure when the way of survival rate test was performed. Every

Table I. Prevalence of common pathogens associated with UTI.

Organisms	Males (%)	Females (%)
<i>E.coli</i>	17	82.9
<i>Klebsiella spp.</i>	26.9	73
<i>Paeroginosa</i>	32	68
<i>Klebsiella oxytoca</i>	100	--

Table II. IMVIC test for confirmation of gram negative organisms

Species	Indole	Methyl Red	Voges-Proskauer	Citrate
<i>Escherichia coli</i>	Positive	Positive	Negative	Negative
<i>Klebsiella spp.</i>	Negative	Negative	Positive	Positive
<i>Proteus vulgaris</i>	Positive	Positive	Negative	Negative
<i>Proteus mirabilis</i>	Negative	Positive	Negative	Positive

Table III. Male–Female Urine samples according to the age group:-

Age Groups	Males (%)	Females (%)
01-10	5.7	10.5
11-25	31.7	35.5
26-35	17.30	21.87
36-45	22.11	33.65
46-55	8.65	8.98
56-65	6.73	5.85
66-75	4.8	2.73
76-85	2.8	0.78

Table IV. Percentage of resistance to the antimicrobial agents among UTIs isolates

Antibiotic	Sensitive	intermediate	Resistant
Amikacin AK30	>19	16-18	<15
Ampicillin AMP10	>17	14-16	<13
Ciprofloxacin CIP5	>22	15-20	<14
Ciphradine CE30	>22	15-20	<14
Cefuroxime CXM30	>18	13-17	<12
Cefixime CFM5	>19	16-18	<15
Fosfomycin FOS50	>15	13-14	<12
Noroxin NOR10	>17	13-16	<12
Pipemidic Acid PIP20	>26	23-25	<22
Tazobactam TZP110	>21	18-20	<17

*Measure zone in mm

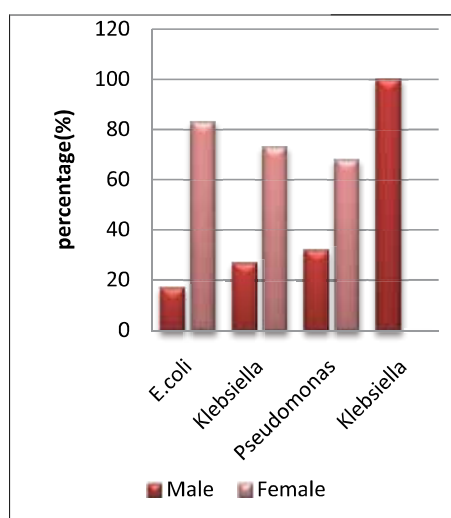


Figure 1. Here is the Estimation of UTI according to Gender Percentage

result was computed in rate (%). Macconkey and cled agar were utilized for the detachment of pathogen. In this study E. coli was the

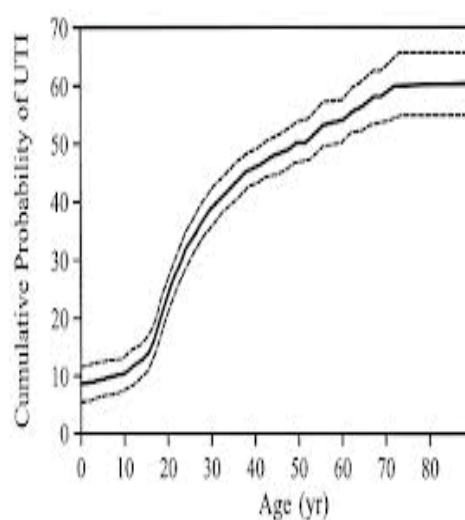


Figure 2. Graphically representation of UTI distribution according to ages.

transcendent life form and constituted (68.77%) of total isolates. This finding demonstrated that E. coli is the commonest pathogen found in

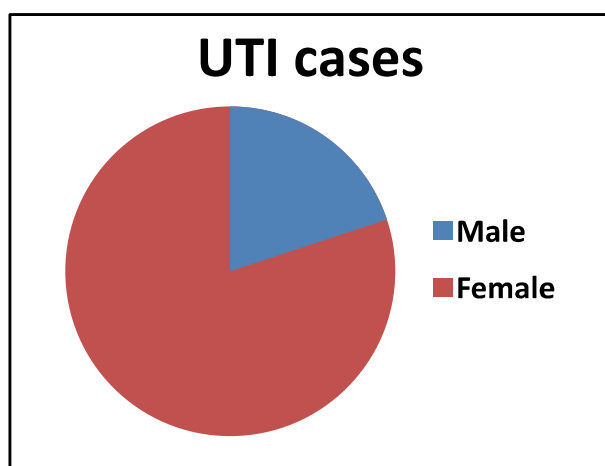


Figure 3. Pie Chart of UTI cases according to Gender Percentage

patient with UTI.

In the study 82 organisms were *E.coli*, 26 were *Klebsiella*, 25 were *Pseudomonas aeruginosa* and just 2 were *Klebsiella oxytoca* and 225 reports were antagonistic in light of the fact that there was no bacterial development from their specimens might be it is because of the individual was having antibiotic treatment or may not experiencing UTI. Fundamentally the dangers of an UTI are that in the event that you take antibiotics for quite a while, microscopic organisms in your body can get to be safe. Microbes that are resistant to antibiotic are difficult to execute. Indeed, even after you take medication to treat the UTI, the disease may return. Without treatment, the contamination and side effects may deteriorate. The microscopic organisms may spread to the kidneys and cause pyelonephritis. This can be an extreme condition, and you may require treatment in the clinic. The contamination can spread to the blood, which can be life-threatening. In the present study UTI happened more in females than in males. Of the 237 samples got 146 (61.60%) were from females while 91 (38.39%) were from males. This is in *Klebsiella oxytoca* were just segregated from male examples. Here it is UTI cases in male and female. Its pie graph demonstrates that the female is more endured to UTI as thinks about to male.

CONCLUSION

E. coli and the most effective antibiotic against all these bacteria was Amikacin. The occurrence of UTI is significantly related to age in the female patients. The organisms showed high resistance to older urinary antimicrobial agents such as Ampicillin and Cephadrine.

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