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RESEARCH ARTICLE

RETROSPECTIVE STUDY OF THE SPECTRUM AND ANTIBIOTIC RESISTANCE OF UROPATHOGENS ISOLATED FROM HOSPITAL AND COMMUNITY PATIENTS

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ABSTRACT

Urinary tract infections (UTI) are the most common infection encountered in clinical practice, amongst community and hospital patients. Knowledge of the aetiology and antimicrobial susceptibility patterns of uropathogens is important in order to determine the best empiric treatment option. This retrospective study was conducted to evaluate the spectrum of microbial aetiology and antibiotic resistance pattern of the uropathogens that causes urinary tract infections to both community as well as hospital patients over a one year period. The clinical data of 827 patients with positive urine culture were collected for the study. The data were from samples collected between October 2012 to September 2013. The aetiology of urinary tract infection and antimicrobial susceptibility pattern were analysed. Out of the 827 urine samples, 635 (76.78%) were either sterile or showed insignificant growth, 192 (23.21%) showed significant growth. The overall most common isolates were: *Escherichia coli*, accounting for 82 (42.7%) isolates, followed by *Klebsiella pneumoniae*, 12 (6.25%), *Acinetobacter* sp., 9 (4.68%), *Citrobacter* sp., 7 (3.64%) and *Staphylococcus aureus* and *Candida* sp., 5 each (2.6%). The ratio of gram negative to gram positive bacteria was 13.8:1. It is also found that both genders at the specific age group of 50-70 were more prone to infection. Out of the 192 cases 103 were out patients and 89 were admitted cases. Antibiotic resistance analysis revealed the multiple drug resistance nature of the isolates to the commonly used antibiotics. Nitrofurantoin provided the widest coverage amongst all the antibiotics tested followed by amikacin, and co-trimoxazole. High resistance was noted among Ampicillin and Amoxicillin/Clavulanic acid. It is also noted that out of the 192 cases 89 patients had severe urinary tract infection which required admission. The culture positive rate for uropathogens was high, with a greater incidence among females. *E. coli* was the most common aetiological agent and remained susceptible to nitrofurantoin. The obtained results suggest that antibiotic selection for empirical treatment should be based on individual drug-sensitive test results. There is also an urgent need to develop a new combination of chemotherapeutic agents and awareness on antibiotic use for the effective UTI management. These data can serve as a basis to develop area specific guidelines for the empirical treatment of UTIs.

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INTRODUCTION

Urinary tract infection is one of the most common disease next to respiratory tract affecting people of all age worldwide [Blair, (2007)]. The treatment of UTI varies according to the age of the patient, sex, underlying disease, infecting agent and whether there is lower or upper urinary tract involvement. Now UTI became quite alarming as isolated uropathogens exhibits high percentage of resistance to almost all antibiotics [Landgeren, (2005)]. For starting an empirical therapy knowledge of the current uropathogens and their susceptibility to commonly used antibiotics is needed. Over use of broad spectrum antibiotics and incomplete course of antibiotic therapy have resulted the evolution of multi drug resistant organisms. The pattern of aetiology of uropathogens is changing area to area. Studies on UTI and the pattern of antibiotic resistance in India are few [Kothari, (2008)]. Hence the present study was undertaken to determine the spectrum of microbial etiology and antibiotic resistance pattern of the

uropathogens that causes urinary tract infections to both community as well as hospital patients.

MATERIALS AND METHODS

The study was carried out in the Department of Microbiology, DM Wayanad Institute of Medical Sciences, Wayanad, Kerala, India. The data of 827 urine samples collected from patients suspected to have UTI were screened. The samples analysed were collected during October 2012 to September 2013. Only the initial samples of an individual received was included to avoid duplication. Only urine from patients with pyuria and bacteriuria involving a single pathogen was included. Pathogens were identified using standard methods and antibiotic susceptibility test was done by Kirby Bauer disk diffusion on Muller-Hinton agar as recommended by CLSI guidelines. The following antibiotics were tested: amoxicillin, amoxicillin/Clavulanic acid, piperacillin/tazobactam, cefoxitin, cefotaxime, netromycin, Gentamycin, norfloxacin,

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nitrofurantoin, ciprofloxacin, trimethoprim-sulfamethoxazole, Amikacin and Imipenem. Diameter of growth inhibition area were measured and Extended spectrum beta lactamases (ESBL) strains were systematically searched by using cefpodoxime (17 mm), ceftazidime (22 mm), aztreonam (27 mm), cefotaxime (27 mm), and ceftriaxone (25 mm). If the organisms showed a zone of inhibition lower than the minimum for any antibiotic disc, ESBL positivity was suspected. The phenotypic confirmation was done by testing the strain against ceftazidime (Ca) and ceftazidime/clavulanic acid. A >5-mm diameter of the zone of inhibition for ceftazidime/clavulanic acid in comparison to ceftazidime was considered indicative of ESBL production. *Escherichia coli* ATCC 25922 was used as an ESBL-negative and *Klebsiella pneumoniae* 700603 was used as an ESBL-positive reference strain.

RESULTS

Data of the 827 consecutive urine samples were included in the study. Of these 635 (76.78%) were either sterile or showed insignificant growth, 192 (23.21%) showed significant growth. The overall most common isolates were: *Escherichia coli*, accounting for 82 (42.7%) isolates, followed by *Klebsiella* 12 (6.25%), *Acinetobacter* sp. 9(4.68%) *Citrobacter* 7(3.64%) and *Staphylococcus aureus* and *Candida* sp. 5 each (2.6%).The ratio of gram negative to gram positive bacteria was 13.8:1. It is also found that both genders at the specific age group of 50-70 were more prone to infection. Out of the 192 cases 103 were out patients and 89 were admitted cases.

Table I Antibiotic susceptibility pattern of the Gram negative isolates (% resistance)

Antibiotics	<i>E.coli</i> n=81	<i>Klebsiella pneumoniae</i> n=12	<i>Acinetobacter</i> n=9	<i>Citrobacter</i> n=7
Amoxicillin	73(90.12%)	12(100%)	7(77.77%)	7(100%)
Ampicillin	73(90.12%)	12(100%)	7(77.77%)	7(100%)
Ceftriaxone	41(50.61%)	7(58.33%)	6(66.66%)	3(42.85%)
Gentamycin	22(27.16%)	5(41.66%)	2(22.22%)	2(28.57%)
Nitrofurantoin	6(7.4%)	10(83.33%)	8(88.88%)	3(42.85%)
Ciprofloxacin	38(46.91%)	6(50%)	2(22.22%)	2(28.57%)
Amikacin	1(1.23%)	2(16.66%)	1(11.11%)	0
Cotrimoxazole	28(34.56%)	7(58.33%)	2(22.22%)	3(42.85%)
Amoxicillin/Clavulanic acid	59(72.83%)	12(100%)	4(44.44%)	5(71.42%)
Piperacillin/tazobactem	10(12.34%)	4(33.33%)	0	1(14.28%)
Norfloxacin	46(56.79%)	8(66.66%)	2(22.22%)	2(28.57%)
Imipenem	2(2.46%)	0	0	0

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Antibiotic resistance analysis revealed the multiple drug resistance nature of the isolates to the commonly used antibiotics. Nitrofurantoin provided the widest coverage amongst all the antibiotics tested followed by amikacin, and cotrimoxazole. High resistance was noted among Ampicillin, Amoxicillin and Amoxicillin /Clavulanic acid (Table I). Out of the 192 cases 89 patients had severe urinary tract infection which required admission. The culture positive rate for uropathogens was high, with a greater incidence among females.

CONCLUSION

In our study, the bacterial culture report shows that more than half of the total cases were having significant UTI, with the majority coming from adult female patients. As expected *E.coli*, was the most common etiological agent identified. The multiple drug resistance among the isolate observed against the regularly used antibiotics is very high. In addition more number of organisms is being resistant to two or more antimicrobials. This may be due to self medication or may be due to attempting medical care only at the advanced stage. The resistance pattern, though not that different from the rest of the world, is ever increasing due to uncontrolled abuse of the available antibiotics. A strong decision has to be established regarding the antibiotic policies for UTI and stringent measures have to be taken to ensure the effectiveness of the same.

References

- Blair KA (2007). Evidence based management of UTIs across the life span: Current updates. *J. Nurse.Pract.*,3: 629-632.
- Clinical Laboratories standards Institute (2009). Performance of standard for antimicrobial disk susceptibility test approved standards. 10thed..Vol 30
- Kothari A and Sagar V (2008). Antibiotic resistance in pathogens causing community-acquired urinary tract infections in India, a multicentre study. *J. Infect. Developing Countries.*, 2:354-8
- Landergen M, Oden H, Kuhn I, Osterland A and Kahlmeter G (2005). Diversity among 2481 *Escherichia coli* from women with community acquired lower UTIs in 17 countries. *J. Antimicrob. Chemothera.*, 55:928-937