ORIGINAL RESEARCH PAPER

Medical Science

URINE CULTURE ISOLATES AND THEIR ANTIBIOTIC SENSITIVITY PATTERN IN A TERTIARY CARE HOSPITAL OF NORTH EAST INDIA

KEY WORDS: UTI, antimicrobial susceptibility

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ABSTRACT

Urinary tract infection is one of the most common bacterial infections seen in clinical practice particularly in developing countries. The present study shall focus on microorganisms responsible for urinary tract infection and their antibiotic susceptibility pattern in a Tertiary Care Hospital in North East India. This study was conducted between January 2017 and May 2018 to check the changing pattern of antibiotic sensitivity among uropathogens causing urinary tract infections (UTI).Out of 188 urine samples, 134(71%) were found to be sterile and 40(21%) depicted bacterial growth and 14(7%) were found to be mixed growth. The most common organisms isolated were Escherichia coli 24(13%) followed by Klebsiella spp. 6 (3%).E.coli isolates reflected maximum sensitivity to Nitrofurantoin, Cefotaxime,Gentamicin,Ceftriaxone-sulbactum,Piperacillin-Tazobactum (100%). This study suggested the need for constant monitoring of susceptibility of specific pathogens in different populations to commonly used anti-microbial agents and formulate local antibiotic policies.

INTRODUCTION:

Urinary tract infections (UTIs) are one of the most common bacterial infections that encountered in developing countries and lead patients to seek medical care. Annual global incidence of UTI has been estimated at least 250million [1,2].Urinary tract infection results from the presence & multiplication of bacteria in one or more structures of the urinary tract with consequent tissue invasion, giving rise to a wide variety of clinical syndromes. Recurrent UTIs warrant the use of multiple courses of antibiotic therapy. Eventually, the risk of antibiotic-resistant organisms is increased. Therefore, choice of suitable antibiotics is a major determinant of appropriate therapy and prevention of chronic complications. Etiological agents of UTI are variable and usually depend on time, geographical location and age of patients. However, Escherichia coli, Proteus mirabilis, Enterobacter agglomerans, Citrobacter frreundii and Klebsiella pneumonia account for over 70% of cases [3,4].Knowledge of the local bacterial etiology and susceptibility patterns is required to trace any change that might have occurred in time so that updated recommendation for optimal empirical therapy of UTI can be made[5].The study was done to find out the isolates and changing trend of antimicrobial sensitivity pattern of bacterial isolate from suspected cases of urinary tract infections among both inpatients and outpatients department of a tertiary care hospital.

MATERIAL AND METHODS:

Study population

This study was conducted between January 2017 and May 2018 to find out the isolates and check the changing pattern of antibiotic sensitivity among uropathogens causing urinary tract infections (UTI). Urine samples (188) were collected from the patient admitted as well as attending outdoor patient department of tertiary care hospital in north east of India.

Sample collection and processing

Freshly voided midstream urine samples (10-20 ml) were collected from patients able to void spontaneously in wide mouth sterile container. The urine specimens were then delivered to the laboratory immediately and processed within one hour.

Culture and Identification

Urine samples were inoculated on Cysteine Lactose Electrolyte Deficient (CLED) agar, MacConkey and Blood agar plates (Hi-Media labs Ltd.) and incubated at 35-37°C for 24 hours using a calibrated loop method delivering 0.001 mL of urine. For gram-negative bacilli, more than 10^5 colonies per mL of urine, whereas for gram positive cocci 10^3-10^5 colonies per ml was considered significant. The culture isolates were further identified by their morphologies and biochemical characteristics.

Antimicrobial susceptibility testing:

The colonies were identified by standard biochemical tests and sensitivity of the organisms was performed by Modified Kirby Bauer disk diffusion method on Mueller Hinton agar plates[6].A suspension of test organism was made in sterile normal saline and turbidity adjusted to 0.5 McFarland standards. The test organism was uniformly seeded over the surface of Mueller Hinton agar plates. The plates were allowed to dry for 10minutes before application of antibiotic impregnated discs. The plates were incubated at 37°C for 16-18 hours. After incubation, clear zones around the antibiotic discs(Hi-Media Lab Ltd, Mumbai) were measured with a ruler and recorded in millimeters. Their sensitivities were interpreted according to Clinical laboratory Standards Institute guidelines.

RESULTS

Out of 188 urine samples, 134(71%) were found to be sterile and 40(21%) depicted bacterial growth and 14(7%) were found to be mixed growth. E.coli remained the most common isolate 24(13%) followed by Klebsiella spp. 6 (3%), Staphylococcus aureus 4(2%) and citrobacter 2(1%), enterococcus species 2 (1%),pseudomonas species 2(1%) as shown in Table 1. E.coli isolates reflected maximum sensitivity to Nitrofurantoin, Cefotaxime,Gentamicin,Ceftriaxone-sulbactum,Piperacillin-Tazobactum (100%). The resistance rate of urinary E.coli isolated was highest for Ampicillin-sulbactum and Prulifloxacin. Klebsiella spp.shows higher sensitivity rate for Amikacin,Gentamicin, Ceftriaxone-sulbactum,Piperacillin-Tazobactum,Quinolones and Cephalosporin groups and lower sensitivity to Co-Trimoxazole,Cefixime,Azithromycin. Sensitivity pattern for all isolates are shown in Table 2. Gentamicin ,Ceftriaxone-sulbactum and Pipercillin-Tazobactum were found to be most susceptible against Enterobacteriaceae (100%)

Table1: Frequency of bacterial isolates

Bacterial isolate	Number	Percentage (%)
E .coli	24	13
Klebsiella species	6	3
Staphylococcus aureus	4	2
Citrobacter spp	2	1
Pseudomonas aeruginosa	2	1
Enterococcus species	2	1

Table 2: Antibiotic susceptibility of Bacterial isolates

ANTIBIOTICS	BACTERIAL ISOLATES					
	E coli	Klebsiella species	Citrobacter spp	Pseudomonas aeruginosa	Staphylococcus aureus	Enterococcus species
	% of Sensitive	% of Sensitive	% of Sensitive	% of Sensitive	% of Sensitive	% of Sensitive
Amoxycillin clavulanate	--	80	--	--	25	--
Co trimoxazole	67	33	--	0	100	0
Nitrofurantoin	100	60	100	100	--	--
Ofloxacin	50	100	--	50	--	--
Ciprofloxacin	36	100	--	100	--	100
Prulifloxacin	20	100	0	--	50	0
Levofloxacin	56	100	50	--	--	--
Azithromycin	--	50	--	--	100	--
Cefoxitin	--	--	--	--	100	--
Cefixime	50	40	--	--	--	--
Cefuroxime	--	67	--	--	33	--
Cefotaxime	100	100	0	--	--	--
Cefpodoxime	29	--	--	--	--	--
Amikacin	94	100	100	100	100	0
Gentamicin	100	100		100	100	--
Ceftriaxone	69	100	100	0	33	100
Ceftriaxone - sulbactam	100	100	100	--	100	100
Piperacillin - tazobactam	100	100	--	100	--	100
Cefepime	75	--	--	--	--	--
Ampicillin sulbactam	0	--	--	0	--	--
Linezolid	--	--	--	--	33	100
Vancomycin	--	--	--	--	100	--

DISCUSSION:

There has been considerable variability in microbial etiology as well as antibiograms for urinary tract infections (UTI) over the decades.Worldwide, the most frequent etiology is *Escherichia coli*[7]. In our study, *E. coli* was the most common isolate (13%). This is similar to studies from other tertiary care centers [8, 9, 10] Gram negative Enterobacteriacae led by E coli and Klebsiella pneumoniae dominated the uropathogens seen in this study, similar to results of other studies elsewhere[11,12,13] E.coli remained the predominate organism which was isolated followed by Klebsiella pneumonia,which was in comprehension with the findings of similar studies by Priya *et al*[14]., Manjunath *et al*[15]., Oladeinde B.H *et al*[16]. Majority of isolates were susceptible to Gentamicin ,Ceftriaxone-sulbactum and Pipercillin-Tazobactum in this study.The antimicrobial susceptibility pattern of present study is clearly indicating decrease sensitivity trends for quinolones group of drugs and high susceptibility as regards of Amikacin and Gentamicin which is similar to those reported by Shalini et al[17] &AshaPai KB et al[18].Fewer number of isolates is the limitation of this study and requires extensive study to explore isolates & antibiotic sensitive pattern.

CONCLUSION:

In current practice, urinary tract infections are often treated empirically and susceptibility tests are often carried out only when the patient has failed one or more courses of antibiotics. The susceptibility and resistance patterns of urinary pathogens should be considered before starting empirical treatment for UTI. The present study confirms that bacterial resistance would be a greatest problem in this part of country. Self-medication because of on counter availability of antibiotics and secondly the unwanted prescriptions of antimicrobials by physicians make the situation worst by development of resistance to commonly used antibiotics for treating UTI. A continuous review of antibiograms is also necessary to track changes in aetiological agents and antimicrobial patterns to help in empirical treatment.

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