A prospective study of bacterial pathogens and antimicrobial sensitivity pattern of urinary tract infection at a tertiary care centre

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Abstract:

Introduction: The spectrum of uropathogens keeps on changing frequently particularly in a tertiary care setting catering a diverse patient population. The present study was conducted to determine the causative organisms and antimicrobials sensitivity patterns of uropathogens at Bidar Institute Of Medical Sciences, Bidar.

Materials and methods: This was a prospective study. In this study 100 patients records with confirmed diagnosis of urinary tract infection from urine culture and sensitivity reports were analyzed from june 13 onwards.

The data was analysed for causative organisms and antibiotic sensitivity pattern of bacterial isolates.

Results: The most common isolated organism was E-coli followed by E.fecalis . In antibiotic sensitivity pattern Vancomycin, Amikacin, Nitrofurantoin showed good sensitivity while Amoxycillin, Ampicillin, Ciprofloxacin, Ceftriaxone showed highest resistance.

Conclusion: The sensitivity patterns of common urinary pathogens towards antibiotics is changing. This study should serve as guidelines for prescribing drugs for treatment of UTI.

Key words : Urinary tract infection(UTI), Antimicrobials, Sensitivity pattern.

Introduction:

Urinary tract infection is a common health problem .(E-coli causes 80-85% acute episodes of uncomplicated UTI Staphyllococcus)[1-4]. Choosing an antibiotic from the wide range available can present a dilemma for prescribers. The difficulty is increased by the variations in sensitivity patterns in different population. The degree of exposure of a population to specific antibiotics could pay a role in this variation[5]. The prerequisite for treatment of UTI are knowledge of causative organisms and antibiotic sensitivity patterns[6]. The spectrum of bacteria that causes UTI is much broader. The pattern of antibiotic sensitivity has undergone considerable variations. The empirical treatment of UTI requires constant updating to the antibiotic sensitivity of the main uropathogens of area or institution[7,8]. Hence this study was done to study the spectrum of bacteria causing UTI and their antibiotic sensitivity pattern in Bidar Institute Of Medical Sciences, Bidar.

Materials and methods:

The study was conducted in Bidar Institute Of Medical Sciences, Bidar after getting approval from the institutional ethical committee.

This is a prospective study in which in which 50 microbiological examinations and antibiotic

sensitivity tests for UTI were studied and analyzed from cultures available.

Identification of bacterial organisms was made on basis of gram reaction, morphology and biochemical features. The antibiotic sensitivity test was performed by Disk Diffusion Method a bacterial suspension was spread on M-H Agar plate by a Swab Antibiotic Disks were placed onto the cultures media surface.

The culture plares were incubated at 37° C for 24hrs then inhibition zones were measured and there by the antimicrobial efficacy was determined. The commercial antibiotics used for isolates included Ciprofloxacin, Trimethoprim methoxazole, Gentamicin, Tobramycin, Ampicillin, Nitrofurantoin, Nalidixic acid, Ceftriaxone, Cefotaxime, Cefalexin, Cefazolin, Amoxicillin, Oxacillin, Cefixime, Ceftazidime, Erythromycin, Tetracycline,

Clindamycin, Ofloxacin and Amikacin in addition to these antibiotics , Pencillin and Erythromycin were used for gram positive bacteria.

Results:

100 Urine samples studied from   to   submitted for analysis and culture randomly. Out of these 58 were males and 42 females

The predominant agents of UTI were successively E-coli(68%), Klebseilla species(20%), pseudomonas aeruginosa(5%), Staphyllococcus(5%), Enterobacter species(1%), Proteus (1%)

Analysis of results according to patient gender represent that, although E-coli is the predominant isolated pathogen from both sexes, it occurred more frequently in females(70%) compared to (30%) in males, were as Klebseilla was higher in males than in females.

Table 1 illustrates incidence of main bacterial pathogens implicated in UTI

TABLE 1: **THE MAIN BACTERIAL PATHOGENS IMPLICATED IN UTI**

BACTERIA	NO. OF CASES POSITIVE		TOTAL
	MALE	FEMALE	
E-COLI	20	48	68
KLEBSEILLA	13	7	20
P. AERUGINOSA	03	02	05
STAPHYLLOCOCCUS	03	02	05
ENTEROBACTER	00	01	01
PROTUES	01	00	01
TOTAL	42%	58%	100%

TABLE 2: **SHOWS SENSITIVITY AND RESISTANCE PATTERNS**

ISOLATES	AMIKACIN S/R	CEFT S/R	AMO S/R	VANC S/R	CEFO S/R	CEFTA S/R	IMP S/R	NITRO S/R
E-COLI	62/6	16/52	6/62	68/0	10/58	20/48	68/0	62/6
KLEBSEILLA	18/2	2/18	0/0	20/0	6/14			17/3
P.AERUGINOSA	5/0	0/5	0/5	5/0	0/5	0/5	4/1	0/5
ENTEROBACTER	1/0	0/1	0/1	1/0	0/1	0/1	1/0	0/1
PROTEUS	1/0	0/1	0/1	1/0	0/1	0/1	0/1	1/0

CEFT- Ceftriaxone, AMO- Amoxicillin, VANC- Vancomycin, CEFO- Cefotaxim, CEFTA -Ceftazidime, IMP-Imipenem, NITRO-Nitrofurantoin, S/R- Sensitivity/ Resistance.

Discussion:

Urinary tract infection in is a significant source of morbidity. It is generally agreed that patients with UTI require further investigation and continuing surveillance to minimize future complications. In our study most of the infections were observed in the female, with a female to male ratio of 1.38:1 different studies reported female predominance, with a variable ratio ranging from 6:1 to 1.33:1, depending upon different sample size, different socioeconomic status and age groups being studied.

The pattern of antimicrobial sensitivity and resistance changes frequently especially in the developing countries, where antibiotics are prescribed. Since E. coli is the leading cause of UTI, empiric treatment should be based on E. coli susceptibility patterns. For our region Vancomycin(68%),Imipenem (68%), Amikacin(62%), Nitrofurantoin (62%) are the best choice for initial therapy. In the published literature, E. coli has generally been reported to have a low resistance rate (0-6%) to Nitrofurantoin, except for the findings of Gokce[9] who reported it to be 15% and Al-Mardeni [10] reported 20.7%. In our study E-coli showed highest resistance to Amoxicillin (62%),

Cefotaxim (58%), Ceftriaxone (52%), Ceftazidime (48%).Our study also recommended Nitrofurantoin for empiric therapy in uncomplicated UTIs, due to its low resistance rate. Increasing antibiotic resistance among urinary tract isolates is a worldwide problem. As the habit of uncontrolled antibiotic use plays an important role in the emergence of resistance isolates, current interventions aimed at reducing unnecessary antibiotic prescribing, especially in the underdeveloped and developing countries, must be supported. It is crucial to establish an international surveillance system to assess uropathogens frequencies and resistance pattern among UTI patients.

Conclusion:

The sensitivity patterns of common urinary pathogens towards antibiotics is changing. The resistant pattern of uropathogens causing urinary tract infections to common antimicrobial agents is changing and it must be taken into consideration when selecting treatment strategies. Appropriate prescription of antibiotics will not only cure the disease properly but will also help in prevention of increasing resistance pattern.

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