FREQUENCY PATTERN AND ANTIBIOGRAM OF ORGANISMS IN PATIENTS WITH URINARY TRACT INFECTION

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ABSTRACT

Objective: To determine frequency, pattern and antibiogram of organisms in patients with UTI.

Material and methods: This Descriptive cross sectional study was conducted in Urology department of Institute of Kidney diseases Peshawar from January 2017 to July 2017.A total of 300 patients comprising 150 males and 150 female were included in the study through non probability consecutive sampling.

Results: A total of 300 patients presented to OPD with clinically suspected UTI were included in the study of them 245(81.67%) had culture proven UTI. Out of 245 culture positive patient 203(82.86%) had gram negative organism in their urine sample and 42(17.14%) had gram positive organism in their urine sample.

Conclusion: Majority of the patient with clinically suspected UTI had culture proven UTI, most of the urinary tract infection was caused by gram negative organism and E.coli was one the most common organism among patient of UTI and was most sensitive to Meropenem (89.39%).

Keywords: C/S culture and sensitivity, UTI urinary tract infection

INTRODUCTION

Infection of urinary tract is important and common cause of infections in human. It ranks second to respiratory tract infections and is major cause of morbidity and mortality in humans. Major causes of urinary tract infections in human are urinary stones, enlarged prostate, urethral strictures, neurogenic conditions of bladder and posterior urethral valves[1]. E coli is the most common organism causing UTI in both males and females.[2] UTIs may be community acquired or nosocomial. Community acquired infection is caused by *Escherichia coli, Klebsiella pneumonia, Proteus mirabilis, Staphylococcus saprophyticus* or *Enterococcus faecalis*, while the hospital acquired ones are *Escherichia coli, Pseudomonas aeruginosa, Proteus species, Enterobacter species, Serratia species* or *Enterococcus*.[3]

Patients with UTI usually seek treatment for complaints of dysuria and frequency[4]. Most cases of UTI can be diagnosed with history alone, as frequency and dysuria together raises the probability of UTI to more than 90% [5,6] Empirical antimicrobial treatment is initiated in majority of UTI cases presented in OPD before result of culture and sensitivity test is available, so overall antibiotics resistance is increasing due to frequent use and change of antibiotics. The pattern of organisms and their sensitivity to antibiotics vary in different regions[7]. Antibiotics are the main treatment for all UTI. Different types of antibiotics can be prescribed for treatment of UTI and the choice depends on whether infection was primary or secondary,UTI was complicated or uncopmlicated[8]. Symptomatic women having low bacterial counts should also be treated as well as asymptomatic infection in pregnancy should be treated. Patient with recurrent UTI may be treated with low dose of antibiotics like nitrofurantion or trimethoprim/sulphamethaxazole for six months to one year.[9,10]

Antimicrobial resistance among bacteria causing UTI is increasing, therefore the current study was undertaken to determine the pattern of organism causing UTI and their sensitivity pattern The literature on prevalence of UTI among patients in Peshawar was scarce in recent decades; therefore the present study was undertaken to find out the prevalence of UTI and to determine the antimicrobial susceptibility patterns of commonly used antibiotics among patients in Peshawar.

MATERIAL AND METHOD

Study Area

The study was carried out in the institute of kidney diseases Peshawar KPK Pakistan. The urine samples were collected from the OPDs (outpatients departments) section of the Institute of kidney diseases Peshawar. The duration of the study was 6 month from January 2017 to July 2017

Study Population

300 patients comprising 150 male and 150 female having clinical evidence of urinary tract infection

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were included in the study. The patients presented to OPD section of the hospital. The patients in the study were from 18 to 60 years. Patients on antibiotics were excluded from study; similarly patients having recent history of hospital admission were excluded from study to rule out hospital acquired infections.

Sample Collection

Clean catch midstream urine was collected from each patient into a 20 ml calibrated sterile screw-capped universal container which was distributed to the patients. The specimens were labeled, transported to the laboratory, and analyzed within 3 hours. In each container boric acid (0.2 mg) was added to prevent the growth of bacteria in urine samples. All patients were well instructed on how to collect sample aseptically prior to sample collection to avoid contaminations from urethra. Verbal informed consent was obtained from all patients prior to specimen collection. The study was conducted after due ethical approval which was subjected to the hospital administration.

Sample Collection

A specimen was considered positive for UTI if an organism was cultured at a concentration of $\geq 10^5$ cfu/ml or when an organism was cultured at a concentration of 10^4 cfu/ml and >5 pus cells per high-power field were observed on microscopic examination of the urine.

Antibiotic susceptibility testing

After 24 h the inhibition zones were measured and interpreted by the recommendations of clinical and laboratory standards. The following standard antibiotic discs were used for the isolates, levofloxacin (LEV), amikacin (AMK), ceftriaxone (CFX), imipenem (IMP), meropenem (MRP), nitrofurantoin (NTF), and co-trimoxazole (COT), co.amoxiclave(COX), cefoperazone/sulbactum(CFB), piperacillin/tazobactum(PPT), fosfomycin(FM)

RESULTS

The most common urinary symptom presented was burning micturation (81.67%) followed by frequency (53.67%), urgency (27%), painful voiding (23.33%), difficulty in micturation (10.66%), and urge incontinence (4.33%) as shown in table 1.

The vast majority of cases of bacteriuria were caused by gram-negative bacteria (82.86%). Major pathogenic gram-negative bacteria included *Escherichia coli* (*E. coli*, 65.02%), *Klebsiella* species (11.33%)' *Pseudomonas aeruginosa* (9.85%), *Proteus* species (9.36%), followed by *Serratia marcescens* (2.96%) and *Providencia* species (1.48%) as shown in table 2, and of the isolates, 17.14% were gram-positive bacteria, mainly *S.aureus* species (40.48%) and *S.epidermidis*(33.33%) species and S.saprophyticus(20.19%) as shown in table 3.

In the antimicrobial sensitivity tests meropenem, and imipenem showed very high (more than 82%) sensitivity in all groups. Other antibiotics that showed high sensitivity in each group were as follows. Amikacin (73.91%), fosfomycin(73.91%), piperacillin/tazobactam (66.66%). As shown in table 4.

DISCUSSION

Urinary tract infection is common worldwide but the anitimicrobial resistance varies among different regions[1,2,3] here we describe relationship between bacterial agent,antibiotics susceptibility and bacterial resistance.The most common uropathogens in our study were E.coli and klebsiella pneumoniae. Although the percentage of E coli in our study is much higher it support the previous studies which shows that E coli is principal etiologic agent in UTI. In another study it was reported that predominant organisms in UTI were E coli followed by klebsiella that also support our study[4]. The similarities and differences in types of uropathogens

Table 1: Presenting Symptoms of UTI

Symptoms	Number	Percentage
Burning micturation	245	81.67%
Frequency	161	53.67%
Urgency	81	27%
Painful voiding	70	23.33%
Difficulty in micturation	32	10.66%
Urge incontinence	13	4.33%

Table 2: Gram negative organism in urine C/S sample.

S.no	Types of organism	Number	Percentage
1	E coli	132	65.02%
2	Klebsiella	23	11.33%
3	P aureginosa	20	9.85%
4	Proteus	19	9.36%
5	Serretia	06	2.96%
6	Providencia	03	1.48%

Table 3: Gram positive organism in urine C/S

S no	Types of organism	Number	Percentage
1	S aureus	17	40.48%
2	S epidermidis	14	33.33%
3	S saprophyticus	11	20.19%

Antibiotics	Antibiotics sensitivity pattern of gram negative organism(%)					
	E coli	P aeruginosa	Klebsiella	Proteus	Serretia	Providencia
Co amoxiclave	54.54	55	43.47	63.15	50	66.66
Co trimoxazole	64.39	60	56.52	73.68	66.66	66.66
Levofloxacin	51.51	50	39.13	68.42	66.66	33.33
Nitrofurantion	75.75	80	65.21	84.21	100	100
Cefoperazon/sul-bactum	74.24	70	52.17	73.68	83.33	100
Imipenem	87.12	90	82.60	89.47	100	100
Ceftriaxone	57.57	60	30.43	52.63	66.66	66.66
Amikacin	81.81	85	73.91	84,21	83.33	100
Fosfomycin	83.33	85	73.91	89.47	100	100
Piperacillin/tazo-bactum	81.06	80	86.96	84.21	66.66	66.66
Meropenem	89.39	95	91.30	94.73	83.33	100

and their sensitivity may result from different environmental conditions and host factors and also from healthcare practices and education programmes and socioeconomic conditions of different countries.[5]

In the treatment of UTIs, selection of antibiotics is a major concern. First-line antibiotics should be chosen in view of effectiveness and prevention of antibiotic resistance. Therefore, urologists have no choice but to use empirical antibiotics considering the antibiotic restriction policy (prefer common antibiotics to restricted antibiotics for preventing resistant bacteria) until the reports of an antimicrobial sensitivity test are available. Unfortunately, few studies have analyzed the results of antimicrobial sensitivity in patients with UTI. Our study thus provides valuable information about first-line antibiotic treatment in patients with UTI. Vancomycin, meropenem, and imipenem showed very high (upto 90%) sensitivity in all groups. However, these antibiotics are restricted and are considered last resort antibiotics. The initial use of these antibiotics before identification of the causative bacteria can produce resistant bacteria. We suggest that choosing the first-line antibiotic by considering the result of an antimicrobial sensitivity test according to the voiding method can produce an increased treatment effect and a decreased production of resistant bacteria.

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