The Most Common Microbial agents of Urinary Infection and Pattern of Antibiotical Sensitivity in Patients Referred to the Central Laboratory of ShahreKord

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Abstract

Urinary tract infections (UTI) are the second common infections, worldwide after respiratory infections. So understanding causes and treatment of these infections is necessary to prevent complications. The aim of this study was to investigate common microbial causes of UTI and antibiotic sensitivity pattern of patients referred to the central laboratory of ShahreKord city during 2020. This study was as descriptive and cross-sectional. Data collection was based on the data of the registry of positive samples of urinary tract infections and based on the studies performed in the laboratory, in terms of the type of pathogen and the type of antibiotic. Data were based on name, age, sex, test result, type of bacteria, and pattern of drug resistance or susceptibility. Finally, SPSS software (version 22) was applied for analyzing. Results showed that 8.2% tests were positive. More positive tests were in the summer season. *Escherichia coli* had the highest frequency. The lowest resistance was related to gentamicin and the highest resistance was related to ampicillin. Therefore, it is vital that ampicillin consumption should be decreased in urinary infection caused by *Escherichia coli* in ShahreKord.

INTRODUCTION

Urinary tract infection (UTI) is one of the most usual infectious diseases faced by physicians and clinicians in spite of the extensive accessibility of antimicrobials UTI has become hard to cure due to entrance of microbes with enhancing resistance to antibacterial agents [1-5].

Certainly, UTIs are the important reason of bacteremia by gram-negative bacteria in cases of all age groups and are related to a great danger of mortality, particularly in the old patients [6-10].

More UTI cases are not human life frightening and do not create any irremediable injury [11]. Nevertheless, when the kidneys are complicated, there is a danger of irremediable tissue hurt with an enhanced hazard of advanced bacteremia [12-15].

Resistance amounts to the most usual used drugs in the management of treatment of UTIs differ noticeably in different parts of world. The approximation of etiology and sensitivity outline can provide better vision for treatment by antibiotics [16-19].

The present study was aimed at evaluation of the common microbial agents of urinary infection and pattern of antibiotical sensitivity in patients in a city of Iran.

MATERIALS AND METHODS

In this descriptive cross-sectional study, the study population included all people who underwent urine culture in the central

laboratory of Shahrekord in 2020. This research was approved by the Ethics Committee of Shahid Sadoughi University of medical sciences, Yazd.

Sampling was by census. Data collection was based on the data of the registry of positive samples of urinary tract infections and based on the studies performed in the laboratory, in terms of the type of pathogen and the type of antibiotic and was studied according to the intended objectives and approved by the supervisor.

Recorded data included name, age, sex, test result, type of bacteria, and pattern of drug resistance or susceptibility. Annual data were 3071 urine tests that formed the sample size of study.

Inclusion criteria included all patients whose urine culture was positive and antibiograms were available, and exclusion criteria included incomplete tests.

Finally, SPSS statistical software (version 22) was used to analyze the collected data.

RESULTS

2260 (73.59%) were female and 811 (26.41%) were male. Of these, 252 (8.2%) tested positive. The study age groups included 394 people in the age range of 1-15 years, 583 people in the age range of 16-30 years, 1113 people in the age range of 31-60, 610 people in the age range of 61-70 years and 371 people in the age range of over 70 years.

The lowest frequency of referrals was related to April with 103 cases. 52 positive tests were observed in spring (21%), 78 positive tests in summer (31%), 55 positive tests in autumn (22%) and 67 positive tests in winter (26%). Of the 252 positive tests, 201 were for women and 51 were for men.

Escherichia coli had the highest frequency (130 cases or 52%). The second infection common agent in patients was *Klebsiella pneumoniae*. Also, the lowest prevalence was observed about *Pseudomonas* (Table 1).

Table 1: Frequency of bacterial contamination in positive samples based on month

Month	Bacteria						
	E. coli	*Klebsiella*	*Staph.*	*Citrobacter*	*Entrococcus*	*Streptococcus*	*Pseudomonas*
April	6	2	0	0	0	0	0
May	11	3	2	0	0	1	1
June	16	3	2	1	2	1	1
July	11	5	1	2	1	0	1
August	9	7	3	2	3	3	0
September	15	6	3	2	3	1	0
October	15	1	2	0	2	1	1
November	9	5	1	0	0	0	0
December	10	3	1	1	1	2	0
January	8	3	3	3	3	2	2
February	12	3	4	1	4	2	1
March	8	1	4	0	2	1	0
Total	130	42	26	12	21	14	7

The results showed that in the studied samples, the lowest resistance was related to gentamicin and the highest resistance was related to ampicillin (Table 2).

Table 2: Frequency of antibiotic resistance pattern in the study population

Antibiotic	Resistance	Susceptibility	Intermediate
Ciprofloxacin	51	188	13
Ampicillin	185	56	11
Nalidixic Acid	171	69	12
Nitrofurantoin	61	182	9
Gentamycin	23	225	4
Co-trimoxazole	68	178	6
Ceftizoxim	43	196	13
Total	602	1094	67

The result of the urine test most likely depended on age and gender (Tables 3, 4).

Table 3: Relationship between urine test and age

Age Group (year)	Test result		Total	P-value
	Positive	Negative		
1-15	43	351	394	0.00001
16-30	37	546	583	
31-60	62	1051	1113	
61-70	58	552	610	
> 70	52	319	371	
Total	252	2819	3071	

Table 4: Relationship between urine test and gender

Gender	Test result		Total	P-value
	Positive	Negative		
Male	51	760	811	0.021
Female	201	2059	2260	
Total	252	2819	3071	

DISCUSSION

In current study, 8.2% cases were positive. Also, the highest frequency was related to 31-60 age group. The lowest frequency of referrals was related to April. More positive cases were associated with summer. *Escherichia coli* had the highest frequency. The lowest resistance was related to gentamicin and the highest resistance was related to ampicillin. A study in western Mumbai from 2008-2010 was performed. Almost 60% cases examined had positive culture. *E.coli* was the most usual agent. Also, the sensitivity amount to gentamicin was very high. This study was similar to current study specially about dominant isolate that was *E.coli* [1].

Another study results in Islamabad, Pakistan showed that *E.coli* was the most bacterial isolate. *E. coli* exhibited the highest sensitivity to amikacin [8]. In current study, the highest susceptibility was related to gentamicin. A study in Sudan also displayed that the most urinary pathogen was *E.coli* and the highest level of resistance was associated with ampicillin [20]. The current study also demonstrated the high resistance to ampicillin.

In Ethiopia investigating antimicrobial susceptibility exhibited that the most common bacterial agent isolated from samples was *E.coli* and the highest resistance was related to ampicillin [17]. This study was also similar to current study in both these subjects (bacteria and antibiotic).

CONCLUSION

In this study, almost 8% of cases had positive test. The lowest incidence of referrals was associated with April. The positive cases were more in summer. *Escherichia coli* had the highest incidence. The highest resistance was related to ampicillin. Thus, it is important that ampicillin should be used lesser in urinary infection caused by *Escherichia coli* in ShahreKord.

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