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Urinary Tract Infection at Shaikh Zayed Hospital Lahore: A Bacteriological Study

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SUMMARY

From July 1993 to June 1994, a total of 7904 urine specimens were collected from inpatients and outpatients of Shaikh Zayed Hospital Lahore, to determine the incidence of urinary tract infection, the predominant aetiological micro-organisms and their antimicrobial susceptibility. Among these, 1909 specimens (24.15%) showed significant bacteriuria. The prevalence was greater in males than in female patients. Most common organisms isolated were Escherichia coli, (28.42%), Klebsiella species (27.09%), Pseudomonas species (12.25%) and Proteus species (11.63%), respectively. Antimicrobial susceptibility showed high resistance to ampicillin and cotrimoxazole, and high susceptibility to amikacin, azteronam and norfloxacin, respectively.

Key Words: *Urinary tract infection, Bacteriuria*

INTRODUCTION

Urinary tract infection (UTI) is a commonly observed condition in clinical practice[1]. It is relatively common in both hospitalized and nonhospitalized patients, particularly in females[2]. It has also been documented that catheter associated urinary tract infections are a major antecedent of Gram-negative septicaemia, a potentially serious condition with a mortality of 20-50 percent[3-4]. Early detection and eradication of bacteriuria and prevention of recurrence reduce the incidence of subsequent life-threatening consequences of persistent or repetitive UTI[5]. Three parameters i.e. urinary symptoms, pyuria and bacteriuria can be used independently or in combination to consider the presence of UTI[6]. The definitive diagnosis cannot be made without bacteriological culture of urine, because patients with classic symptoms of UTI may have sterile urine and asymptomatic patients may have infected urine. The laboratory diagnosis of UTI depends upon the demonstration of significant bacteriuria i.e.10^5 organisms per ml by quantitative or semi-quantative culture of freshly voided specimen of urine[7-9]. The aim of this study was to determine the incidence of UTI, the predominant aetiological micro-organisms and their antimicrobial susceptibility.

MATERIAL AND METHODS

Clean-catch midstream and catheter urine specimens from inpatients (IP) and outpatients (OP) were collected over a period of 12 months, from July 1993 through June 1994.

Specimens of the urine were collected in sterile screw capped containers, transported to the microbiology laboratory within 30 minutes of collection. Specimens were processed immediately after their arrival in the laboratory. Each urine specimen was mixed well and by using a 5 mm diameter calibrated loop[10] was delivered to a plate of cystine lactose electrolyte deficient (CLED) agar. After streaking, the plates were incubated at 37 °C for 24 hours and colony formation units were counted for the presence of bacteria in urine. For the identification of the isolates standardized diagnostic method were used[11]. Antimicrobial susceptibilities were determined by using the method of Stokes[12].

RESULTS

During the study period, a total of 7904 urine specimens were collected for culture and sensitivity tests, from patients of medical, surgical, paediatric wards and patients attending OPD of Shaikh Zayed Hospital, Lahore. Among these, 4988 specimens were of male and 2916 female patients (Fig. 1). From IP, 5410 (68.44%) specimens were obtained while 2494 (31.55%) were from OP clinics. Significant bacteriuria was detected in 1909 cases. Males were 1135 (59.45%) and females 774 (40.54%) with a ratio of 1.4:1, giving an overall incidence rate of 24.15 percent.

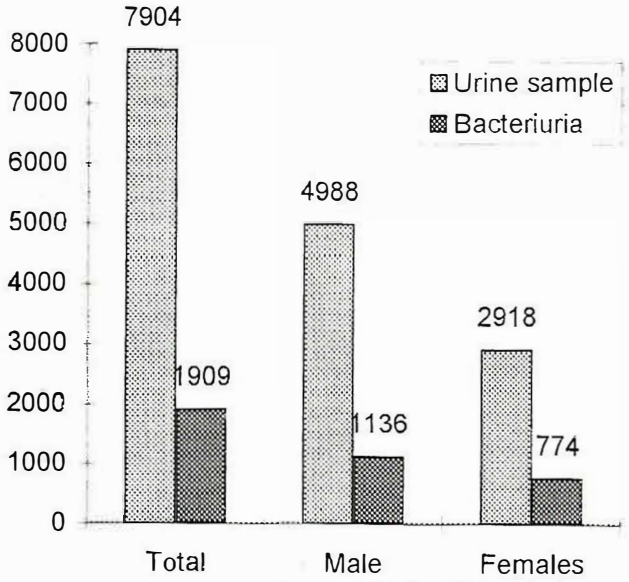

Fig. 1: Total urine sample processed and bactriuria.

Table 1 shows the number of patients with significant bacteriuria categorized by age group and sex. The male prevalence was noticed in all the age groups. Increase frequency of UTI 323 (16.91%) occurred in age group 41-50 years.

The organisms isolated from urine of IPs and OPs with UTIs are shown in Table 2. The most frequently encountered organisms were Escherichia coli (E. coli), Klebsiella, Pseudomonas and Proteus species, respectively. There was no significant difference in the microbial aetiology of IPs and OPs. Escherichia coli was the most common isolate in both IP and OP specimens.

The antimicrobial resistance pattern of important Gram-negative isolates is shown in table 3. E. coli, Klebsiella and Proteus species showed a high resistance to ampicillin and cotrimoxazole and Pseudomonas species showed high resistance to cefotaxime and pepemedic acid. The organisms isolated from IP specimens showed more resistance than the organisms isolated from OP specimens.

Table 1: Age and sex distribution of patients with urinary tract infection.

Age (yrs)	*Male*	*Female*	*Total*	*Percent*
<1	71	42	113	5.91
1-10	118	62	180	9.42
11-20	62	54	116	6.07
21-30	150	131	281	14.71
31-40	158	137	295	15.45
41-50	190	133	323	16.91
51-60	172	103	275	14.40
61-70	131	63	194	10.16
71-80	60	32	92	4.81
>80	23	17	40	2.09
Total	**1135**	**774**	**1909**	**100.00**

DISCUSSION

Urinary tract infection is a common problem all over the world. Incidence of UTI in our study was 24.15%, which is higher than other reported studies[13]. This may either be due to increasing awareness in doctors about the disease or due to better laboratory facilities for the diagnosis of the disease. Infection was more prevalent in males than in females (1.4:1); which is inconsistent with other studies[14-15], where females were the most prevalent group. This may be due to preferential treatment given to males in our part of the world as indicated in Figure 1.

There is no significant difference between the aetiological agents isolated from urine specimens of IPs and OPs. The most common aetiological agent was E. coli followed by Klebsiella, Pseudomonas and Proteus species, respectively. Our results are comparable with some studies[16-17], but differs from the study of Mahgoub et al[18], where E. coli accounted for 75 percent of isolates.

Analysis of antimicrobial resistance patterns showed that, the E. coli, Klebsiella and Proteus species were highly resistant to ampicillin and cotrimoxazole, which is comparable to the study of Khan et al[19] from Lahore. This high frequency of resistance was expected, because ampicillin, its derivatives and cotrimoxazole are continued to be

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Table 2: Distribution of different micro-organisms isolated from patients with urinary tract infection

Organisms	*Inpatients (n = 1490)*		*Outpatients (n= 427)*		*Total (n = 1917)*	
	No.	*%*	*No.*	*%*	*No.*	*%*
Escherichia coli	434	29.12	111	25.99	545	28.42
Klebsiella sp.	424	28.45	95	22.24	519	27.09
Pseudomonas sp.	180	12.08	55	12.88	235	12.25
Proteus sp.	174	11.67	49	11.47	223	11.63
Staphylococcus aureus	118	7.91	33	7.72	151	7.87
Enterococcus	72	4.83	43	10.07	115	5.99
Acinitobacter sp.	42	2.81	19	4.44	61	3.18
Enterobacter	20	1.34	8	1.87	28	1.46
Citrobacter	14	0.93	5	1.17	19	0.99
Staphylococcus cagulase negative	12	0.80	9	2.10	21	1.09

Table 3: Resistance pattern of organisms isolated from inpatients and outpatients urine (%).

Antimicrobial agents	*E. coli*		*Klebsiella sp.*		*Pseudomonas sp.*		*Proteus sp.*	
	Inpatients	*Outpatients*	*Inpatients*	*Outpatients*	*Inpatients*	*Outpatients*	*Inpatients*	*Outpatients*
Amikacin	8.37	7.23	8.33	6.24	9.25	7.86	7.14	2.89
Amoxycillin/ Clavulanic acid	30.15	29.91	30.48	28.75	-	-	26.53	20.05
Ampicillin	87.71	78.52	93.33	75.55	-	-	78.50	65.78
Azteronam	9.60	9.80	10.55	8.71	12.11	8.87	8.67	5.55
Cefotaxime	20.65	13.04	21.73	10.00	49.72	42.32	21.95	9.09
Cotrimoxazole	81.28	76.32	90.56	77.87	-	-	79.12	70.89
Enoxacin	21.21	21.10	14.04	13.79	42.02	31.81	17.64	9.09
Gentamycin	32.85	28.88	35.62	30.34	40.57	39.12	30.62	26.71
Norfloxacin	19.45	15.18	21.08	16.32	36.64	34.29	22.00	8.50
Ofloxacin	20.00	16.62	12.82	5.88	42.15	25.92	16.36	11.53
Pepemedic acid	35.91	28.24	35.07	17.51	48.68	47.11	32.02	11.42
Tobramycin	26.25	20.03	29.91	17.85	38.63	37.89	33.33	6.25

the most widely used antimicrobial drugs throughout the world. At our hospital, the decreased resistance to amoxycillin/clavulanic acid as compared to ampicillin implies that the high resistance to ampicillin is due to beta lactamase production, the main mechanism for bacterial resistance to beta lactam antibiotics[20-21]. Pseudomonas species showed increased resistance to cefotaxime and pepemedic acid when compared with other antibiotics as shown in Table 3, which agrees with the study of Farooqui et al[22].

CONCLUSION

Our study indicate the increase incidence of UTI as compared to other reported studies, increased prevalence of organisms within male population and E. coli appeared as the most common aetiological agent of UTI in both IPs and OPs. Organisms appeared to be a highly resistant to ampicillin and because of its high level of resistance this drug should not be the first drug of choice for empirical treatment of UTI. Due to variability in antibiotic

sensitivity, no single drug is recommended, however, amoxycillin/ clavulanic acid may be used as empirical therapy until the sensitivty results are available. Finally we must stress that the UTIs should be investigated fully including microbiological cultures and antibiotic sensitivity tests.

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