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Prevalence of Urinary Tract Infections in Akola City

KEYWORDS: UTI, prevalence, uropathogens

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ABSTRACT *Urinary tract infection (UTI) remains to be the most common infection diagnosed in outpatients as well as in hospitalized patients. Appropriate knowledge on the current prevalence and pattern of uropathogens is essential for appropriate therapy. The present study was carried out to know about the prevalence and predominant bacteria from Akola city. In present investigation the ratio of female suffering from UTIs was more than male. Female comprised 61.40% of UTIs while male was 38.60%. From the distribution it was observed that UTI was more prevalent in the age group above 60 years than other age groups. Five different types of pathogens were isolated from the urine samples. Escherichia coli was the most common etiological agent of UTI in our study which accounts for 49.01% followed by Klebsiella pneumoniae (21.35%), Pseudomonas aeruginosa (15.23%), Proteus species (9.27%) and Staphylococcus aureus (4.64%).*

Introduction

Urinary tract infections (UTIs) are the most common bacterial infections, accounting for 25% of all infections. UTIs occur in all populations and ages, however it is common in women. It also contributed as the most common nosocomial infection in many hospitals and accounts for approximately 35% of all hospital acquired infections. In addition, the financial impact is enormous with costs exceeding $1.6 billion for community acquired UTI (5).

The epidemiology and prevalence rates of UTI are grouped by age, sex, race and circumcision status of the patient. Resistance to commonly used antibiotics were found to be very high among the isolates due to prolonged use of antibiotics as the use of antibiotics can damage periurethral flora, allowing uropathogens to colonize and subsequently to infect the urinary tract, leaving clinicians with very few choices of drugs for the treatment of UTI.

Urinary tract infection (UTI) defines a condition in which the urinary tract is infected with a pathogen causing inflammation. Infection of the urinary tract is a common, distressing and occasionally life threatening condition. UTI is one of the most common diseases, occurring from the neonate up to the geriatric age group. The clinical features, diagnosis, treatment, complications and long term significance vary depending upon the site of infection and various factors. The present study was conducted with the motive to have a precise knowledge of the prevalence and associated microflora among urinary tract infection from Akola city.

Material and methods

Sample collection, handling, and transport

A total of 300 specimens were collected from different hospitals. A freshly voided midstream urine samples (10-20 ml) were collected from non catheterized patients in wide mouth sterile container. Catheter urine specimens (10-20ml) from catheterized patients were transferred to a sterile container after cleansing the out let of catheter with appropriate disinfectant. The urine specimens were then delivered to the laboratory immediately and processed within one hour.

Analysis of specimen

All the urine specimens were subjected to culture for quantitative and qualitative assessment of bacteria Quantitation was performed by standard calibrated loop method. Urine specimens obtained were inoculated on Cystein Lactose Electrolyte Deficient (CLED) agar and MacConkey agar (Himedia) by using calibrated loop (0.001/ml). Cultures were incubated in aerobic atmosphere at 37° C for 18-24 hrs. A positive urine culture was defined as colony count > 10^5 cfu/ml for mid stream urine and > 10^2 cfu/ml for catheter urine and were considered as significant bacteriuria as per the Kass count (7). Uropathogens were identified by standard conventional methods.

Table1. Incidence of bacteriuria in different sex

Sr. No	Sex	Total urine specimens cultured	Specimens with significant bacteriuria	
			No of samples	Percent (%)
1	Male	117	44	38.60
2	Female	183	70	61.40
	Total	300	114	100.00

Table 2. Age group and sex wise distribution of UTI

S. No	Age groups	Sex		Total	
		Male	Female	No. of samples	Percent (%)
1	0-10	04	03	07	06.14
2	11-20	05	05	10	08.77
3	21-30	06	11	17	14.91
4	31-40	04	14	18	15.79
5	41-50	03	18	21	18.42
6	51-60	08	08	16	14.04
7	Above 60	14	11	25	21.93
		44	70	114	100.00

Table 3: Morphological and Biochemical characters of uropathogens

Characters	Name of organism				
	E. coli	K. pneumoniae	Ps. aeruginosa	Proteus spp.	S. aureus
Gram reaction	-ve	-ve	-ve	-ve	+ve
Shape	Cocobacilli	bacilli	bacilli	bacilli	cocci
Motility	motile	non- motile	motile	motile	non- motile

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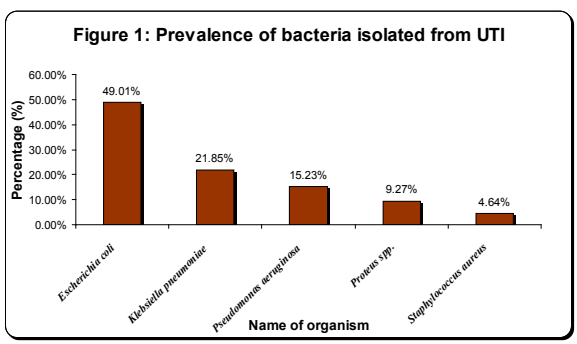
Colony dia. (in mm)	2-3	2-4	0.5-1.5	1-2	0.5-1
Elevation	convex	convex	flat	convex	convex
Consistency	Non- mucoid	mucoid	Non- mucoid	Non- mucoid	Non- mucoid
Colour on MSA	NA	NA	NA	NA	Yellow
Colour on CLED	colourless	Whitish blue	NA	Blue green	Golden yellow
Colour on Cetrimide Agar	NA	NA	NA	Grey	NA
Color on Endo Agar	Red with metallic Sheen	Pink mucoid	Colour less to pink	Colour less to pink	N.A.
Indole	-ve	+ve	-ve	+ve	-ve
Methyl red	+ve	+ve	-ve	+ve	+ve
Voges-proskeurs	-ve	-ve	-ve	+ve	+ve
Citrate	+ve	-ve	+ve	-ve	-ve
Catalase	+ve	+ve	+ve	+ve	+ve
Urease	-ve	+ve	NA	+ve	+ve
Coagulase	NA	NA	NA	NA	+ve
Oxidase	NA	+ve	+ve	+ve	+ve
Desulfurase	+ve	+ve	NA	+ve	+ve



RESULTs

A total of 300 urine samples were analyzed for isolation and identification of bacterial isolates as per standard methods. Out of 300 samples 117 were from male and 183 from female. Out of 300 samples of urine cultured, 114 (38%) were found to be with significant bacteriuria; containing 44 from male and 70 from female. The incidence of UTI in different genders is shown in Table 1. From the distribution it was observed that UTI frequently observed in female as female population showed 61.40% of UTIs while male was 38.60%.

The distribution of UTIs as per the demographic characteristics i.e. age groups and gender was also studied and is presented in Table 2. From the results it was seen that UTI was more prevalent in the age group above 60 years. The no. of male was found to be more than the female (14 male, 11 female). The second age group was between 41-50 years which showed 18.42% of incidence of UTI. The female population was found to be more prone than male. The third age group was between 31-40 years accounting 15.79%. The fourth group was between 21-30 years showing incidence of 14.91%. The age group between 51-60 years ranked fifth showing equal no. of male and female patients while the incidence was recorded 14.04%. The age group between 11-20 years accounts for 8.77% which also showed equal incidence between male and female. The overall least incidence, 6.14% was seen in the age group 0-10 years with more no. of male than female.

In present study 151 five different types of bacterial isolates were isolated from the urine samples. The organisms were identified according to Standard Conventional Methods (Table No. 3). The frequency of pathogens and ranking order is shown in Fig.1. Out of 151 isolated uropathogens, *Escherichia coli* was the most common etiological agent of UTI in our study which accounts for 49.01% (74/151). The *Klebsiella pneumoniae* comprised 21.35% (33/151), was found to be the second predominant organism. The third most commonly isolated organism was *Pseudomonas aeruginosa* comprised 15.23% (23/151). It was followed by another member of *Enterobacteriaceae* family *Proteus* species accounting for 9.27% (14/151). The Gram positive, *Staphylococcus aureus* was also isolated in less percent than other, 4.64% (7/151).

DISCUSSION

The prevalence of UTI in population was found to be 38%. This figure is in agreement with another studies (1, 4, 14). The other investigator Akram *et al.*, (2) who recorded less prevalence rate i.e. 10.86%. While Mbata, (11) and Kolawale *et al.*, (9) reported prevalence of UTI higher than the present study as 77.9% and 60% respectively.

In present study it was observed that the incidence of UTI is more among female than male. Out of 114 positive samples 61.40% were from female while 38.60% obtained from male. This is an agreement with other reports of Keah *et al.*, (8) who reported 64% female and 36% male experiencing UTI's. Akram *et al.*, (2) reported 66.66% of female and 33.34% of male. Kolawole *et al.*, (9) also reported the same prevalence among female and male (66.66% and 33.33%) while Behroozi *et al.*, (3) reported even higher figure 77.74% for female, encountered in positive urine culture while the value for male was lower, 22.25%. Statistically when data was analyzed the value found to be non significant (χ^2 0.325, df 1, P=0). It does not supports the hypothesis considered that infection is independent of sex. The reason behind the higher prevalence of UTI in female than male may be either due to anatomical predisposition or uroepithelial mucosa adherence to the mucopolysacharide lining or the host factors (15).

The incidence of UTI was also determined in different age groups in the present study. As per the demographic characteristics the prevalence of UTI was higher in the age group above 60 years. The incidence recorded was 21.93% of overall population containing more male population than female. This in harmony with the other studies of (8, 11). This might be due to the physiological and immunological changes occur in this age group persons. The other results are also comparable and found degree of similarities as we found the least incidences of UTI occurs among 0-10 years age group with more male and less female which was also similar with that of Mahesh *et al.*, (11). While incidences differs with different age groups among male and female from 11-50 years age groups with somewhat more or less changes in the figures between the present study and findings of the other investigators (11,13,10).

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The findings of our study showed that, *Escherichia coli* was the predominant pathogen isolated from urine samples of UTI patients. These finding is in fair correlation with the other study in which *Escherichia coli* has been reported the most predominant pathogen associated with UTI's (6, 13). Among the Gram positive organisms *Staphylococcus aureus* was accounted for 4.64% only, which makes it less prevalent organism in UTI's. But even though the incidence of *S. aureus* is less, it is considered as well recognized pathogen. A number of studies have documented the clinical significance of *S. aureus* as causative agent of UTI's (6, 12, 13).

Understanding the prevalence of Urinary Tract Infection in various populations will help to guide at the appropriate level of suspicion and the appropriate work-up for urinary tract infection. It is difficult to assess the accurate incidence of UTI due to under reporting. This situation is complicated as the accurate diagnosis of UTI depends on both the presence of symptoms and positive urine culture. Asymptomatic bacteriuria is a very important sign in epidemiological studies, as it allows revealing early stages of UTI and doing the suitable prophylactic action timely.

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