Original article

Urine culture pattern in Norvic International Hospital

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Background: Urinary tract infections are responsible for considerable morbidity particularly in sexually active women. The aim of this study was to study the distribution of age and sex for significant growths isolated in urine specimens, the microorganisms associated and their sensitivity pattern to antibiotics

Methods: Data on age, sex, organism isolated and sensitivity pattern was collected for all (total 103) culture positive urine samples sent between Baisakh 2064 to Bhadra 2064.

Results: Majority of patients were females and most were between 20-39 years of age. E. coli was the most common organism isolated (81.6%) followed by Proteus (16.5%). E coli showed sensitivity to cefotaxime, ceftriaxone and cefexime in most cases.

Conclusion: Females in sexually active age group show significant bacterial growth in urine more frequently than males . E coli are the commonest pathogen isolated.

Key words: Antibiotic sensitivity, urine culture, urinary tract infection

Introduction

Urinary tract infections(UTI) are the commonest bacterial infection managed in general practice and are responsible for considerable morbidity particularly in sexually active women. Except in first year of life and after age of 60 years, UTI predominantly effect females. UTI may range from asymptomatic bacteriuria to severe sepsis, often with hospital acquired organisms and in high risk patients such as diabetics or those on immunosuppressive therapy.[1]

E. coli is the predominant urinary tract pathogen. Other pathogens that are more frequently seen in hospitalized patients include Proteus, Streptococcus fecalis, Klebsiella pneumonia, Pseudomonas auerginosa and Serratia marcescens. A fair proportion of UTI in symptomatic women are due to Staphylococcus saprophyticus. [1]

Infection due to 2 or more bacterial species or to more than 1 serotype of E.coli are uncommon. A genuine mixed infection is most common in patients with multiple urinary calculi , where a different pathogen resides in each stone[1]

The incidence of UTI in infants ranges from approximately 0.1 to 1.0 percent in all newborn infants to as high as 10 percent in low-birth-weight infants. Infection of the urinary tract before age one occurs more frequently in boys than in girls. After one year of age, both bacteriuria and UTI are more common in girls.[2] Prevalence in nuns and unmarried women is low as compared to sexually active women[3]

The aim of this study was to study the distribution of culture positive urinary tract infection in patients of different age and sex, the microorganisms associated and their sensitivity pattern to antibiotics in Norvic Escort International Hospital.

Materials and Methods

This was a hospital record based study. Data on age, sex, organism isolated and sensitivity pattern was collected for all urine samples sent to the Pathology laboratory of Norvic Escort International Hospital, which is a private hospital in Kathmandu , for culture and sensitivity from in patients as well as out patient departments between Baisakh 2064 to Bhadra 2064 . In Norvic, mid stream, clean catch, specimens are collected in a sterilized container. Urine samples are delivered to the laboratory within 1 hour of collection. In case of delay the urine samples are kept at 4^{o}C and analyzed within 6 hours of the collection. The urine samples are

cultured in 5% blood agar and MacConkey's media. Inoculation is done with the help of a 0.001ml caliber loop. All the sample plates are incubated for 24 hrs at 37°C. If growth is seen after 24 hours, antibiotic sensitivity is done by disk diffusion method on Mueller Hinton agar. A bacterial count of 10^5 /ml is considered significant . It was assumed that all the specimens were collected and processed as described above.

Results

Total 1428 specimens were sent to laboratory for culture during the five months of study period. Out of these 643 were urine samples. 103 /643 (16%) of these showed significant growth. 65 (63.1%)culture positive samples were from females where as 38 (36.9%) were from males .35% patients with growth isolated in culture were females between 20-39 years of age. 38 specimens from males showed growth. Out of these 44.7%(17) were between 40-59 year age group. E. coli was the most common organism isolated (81.6%) followed by Proteus (16.5%).

Table1: Distribution of patients with positive urine culture, according to age and sex

Age group	Sex (%) Female	Male	Total (%)
0-9	0(0)	2 (1.9)	2(1.9)
10-19	0(0)	4(3.9)	4(3.9)
20-29	18(17.5)	2(1.9)	20(19.4)
30-39	16(15.5)	3(2.9)	19(18.4)
40-49	6(5.8)	9(8.7)	15(14.6)
50-59	3(2.9)	8(7.8)	11(10.7)
60-69	10(9.7)	4(3.9)	14(13.6)
70+	12(11.7)	6(5.8)	18(17.5)
Total	**65(63.1)**	**38(36.9)**	**103(100)**

Most patients were females between 20-39 years.

Table: 2 Different types of organisms isolated in males and females

Organism isolated	Sex Female	Male	Total (%)
E. coli	54	30	84 (81.6)
Proteus	11	6	17(16.5)
Klebsiella	0	1	1(1)
Pseudomonas	0	1	1(1)
Total	**65**	**38**	**103(100)**

E. coli was the commonest organism identified

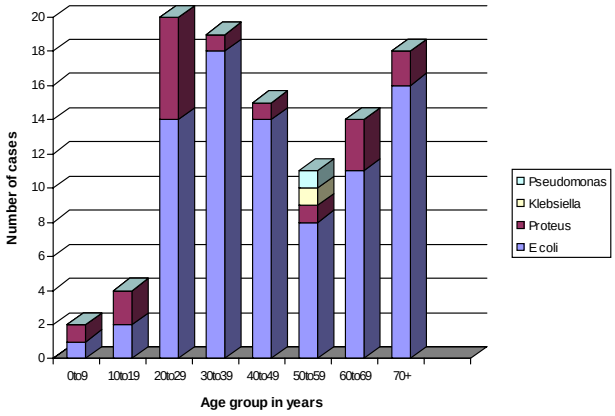

Fig.1: Distribution of different organisms isolated in different age group

Common antibiotics tested were ciprofloxacin, norfloxacin, ofloxacin, nalidixic acid, cefotaxime, ceftriaxone and

Table: 3 Antibiotic Sensitivity pattern of organisms isolated

		E coli (84)	Proteus (17)	Klebsiella (1)	Pseudom -onas(1)
Ciprofloxacin	**S**	49	6	1	1
	R	35	11	0	0
	NT	0	0	0	0
Norfloxacin	**S**	38	9	0	1
	R	44	8	0	0
	NT	2	0	1	0
Ofloxacin	**S**	55	11	1	1
	R	29	6	0	0
	NT	0	0	0	0
Nalidixic acid	**S**	24	3	0	0
	R	57	14	0	1
	NT	3	0	1	0
Cefotaxime	**S**	49	8	1	1
	R	8	5	0	0
	NT	27	4	0	0
Ceftriaxone	**S**	67	13	1	1
	R	7	2	0	0
	NT	10	2	0	0
Cefexime	**S**	70	8	1	0
	R	8	7	0	1
	NT	6	2	0	0
Gentamycin	**S**	20	4	1	0
	R	1	2	0	0
	NT	63	11	0	1

S=sensitive; R=resistant; NT: sensitivity not tested

cefexime. E coli showed sensitivity to cefotaxime, ceftriaxone and cefexime in most cases . Sensitivity to ciprofloxacin and norfloxacin were less as compared to sensitivity to cephalosporins. E.coli was sensitive to cefotaxime in 86% , to ceftriaxone in 90.5% and to cefexime in 89.7% cases . where as it was sensitive to ciprofloxacin only in 58.3%, to norfloxacin in 46.3% to ofloxacin in 65.5% and to nalidixic acid in 29.6%.

Discussion

Although urine is generally sterile, it is common particularly in women to recover few contaminating organism. Proper interpretation of urine culture result depends upon quantity, purity and identification of microorganisms in addition to associated findings of pyuria. Presence of more than 10^5 organisms/ml is classic quantitative definition of significant bacteriuria. Although this serves as a dependable guideline under most circumstances, there is no quantitative measure that will conclusively define presence or absence of infection. Numerous variables effect urine bacterial count. Among some more important factors are how carefully the specimen was collected, how rapidly it was processed, site of infection and type of organism.[4]

A single midstream urine (MSU) with bacterial count of 10^5/ml represents only 80% confidence level in diagnosing UTI in asymptomatic females. To ensure more accuracy in diagnosis, multiple cultures of MSU are necessary in those without symptoms. In most males, where there is much reduced risk of contaminating a voided MSU specimen, a bacterial count of greater than 10^5/ml of a pathogen may be taken to indicate true infection with high degree of confidence. [1]

Urinary tract infection mostly arises from invasion of microorganisms through external urethral meatus. Short female urethra and bacterial colonization of vaginal introitus are important predisposing factors , accounting for 10 fold or higher incidence of UTI among younger females as compared to men. Similar to the literature, in this study also , majority of the patients were females belonging to sexually active age group [1, 4,5]

Of all urine samples submitted to hospital for culture 20-40% yield etiological diagnosis.[4] E. coli is responsible for 60-80% of UTI [6]. Proteus infection tends to occur in patients with obstructive lesion of urinary tract, following diagnostic instrumentation or during prolonged catheterization.[6]

In this study significant bacterial growth was isolated in 16% of urine samples culture and E. coli was identified in 81.6% of urine cultures . This is also consistent with the literatures [1, 5,7] which mention E. coli to be the commonest bacterial pathogen of urinary tract. Proteus ,Klebsiella and Pseudomonas constituted smaller percentage of cases in this study also like other studies.[5] Catheterization of urinary bladder result in urinary tract infection or colonization. One study [8] showed that each day of urinary bladder catheterization increased the risk of development of urinary tract infection by 21.7%

In this study 16.5% UTI was attributed to Proteus and Klebsiella was seen in only 1% where as other studies have found Klebsiella to be more common than Proteus. [7,9]

Urinary tract infections in children are particularly important because their occurrence may be associated with some congenital abnormality of the urinary tract . However this study has small number of pediatric patients, so no comment on UTI in paediatric population is made here.

Conclusion

Like mentioned in literature , most patients with culture positive UTI were females in sexually active age group, E. coli was the most common organism isolated and most of these E coli were found to be sensitive to cefotaxime, ceftriaxone and cefexime.

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