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BACTERIAL COUNTS IN CHILDREN WITH URINARY TRACT INFECTION AT CCM MEDICAL COLLEGE AND HOSPITAL

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ABSTRACT

Urinary tract infection (UTI) is common cause of infection. It is most common cause of acute illness in children. The term UTI encounter a variety of clinical problems, ranging from asymptomatic bacteriuria to cystitis, prostatitis, and pyelonephritis. In children due to lack of overt clinical features, proper collection of urine samples and basic diagnostic test in health facilities in developing countries. UTI in children may be difficult to recognize because there are not present of specific signs and symptoms. UTI in children may be difficult to recognize because there are not present of specific signs and symptoms. In children it is not easy to collect and interpretation of urine test; therefore it may not always possible to unequivocally confirm the diagnosis of UTI. The aim of this study is to know distribution of uropathogens among the children suffering from urinary tract infection. ***Material and methods:*** *Total 100 urine sample were collected and process with stander procedure in the department of microbiology laboratory during Nov 2013 to Jan 2015 Hospitalized and OPD patients of ages below 15 years, either sexes, with a clinical diagnosis of UTI.* ***Result:*** *UTI was more common in females 60(60%) cases as compared to 40(40%) males. 50 were both Gram stain as well as culture positive while 24 samples were both culture as well as Gram stain negative showed. The maximum no. of bacterial isolates was from hospitalized patients, 60(60%) as compared to OPD patients, 40(40%).* ***Conclusion:*** *Urinary tract infections are most common infections in the pediatric population. Pediatric UTI may lead to significant acute morbidity and irreversible renal damage if not treated promptly and appropriately. It is important for clinician in order to facilitate the treatment and management of patients with symptoms of UTIs.*

KEYWORDS: *Children, UTI, Uropathogens.*

INTRODUCTION

Urinary tract infection (UTI) is common cause of infection. It is most common cause of acute illness in children. The term UTI encounter a variety of clinical problems, ranging from asymptomatic bacteriuria to cystitis, prostatitis, and pyelonephritis. In children due to lack of overt clinical features, proper collection of urine samples and basic diagnostic test in health facilities in developing countries. Generally UTI is not reported as a cause of morbidity in children. According to the Canadian pediatric society (CPS) in 2004 guidelines and recommendation on management of UTI, in children's it is febrile cause of illness.[1] UTI in children may be difficult to recognize because there are not present of specific signs and symptoms. In children it is not easy to collect and interpretation of urine test; therefore it may not always possible to unequivocally confirm the diagnosis of UTI.[2] Meta-analytic reviews investigating the effectiveness of diagnostic tests and randomized control treatment have been published.[3,4,5] The American Academy of Pediatrics in 2011, remarkedly revised its clinical practice and guideline for managing and diagnosing of inceptive febrile UTI in children.[6] By several years ago, acute UTIs are relatively common in children. By the age of seven years, 2 percents of boys and 8 percentages of girls will have at least one episode of UTI.[7] The reference standard for the diagnosis of UTI is a single culture from specimens obtained at concentration as suprapubic aspiration specimens, greater than 1,000 colony forming unit per ml; in catheter specimens greater than 10,000 CFU per ml and in case of clean catch midstream specimen 100,000 CFU per ml or greater.[8,9,10] However in establishment guidelines it has been not included use of lower colony count in symptomatic patients has been recommend.[11]

Approximately 85 percent of UTIs in children, Escherichia coli is the main causes in uropathogens whereas other common uropathogens include Klebsiella, Proteus, Enterobacter, Citrobacter, Staphylococcus saprophyticus, and Enterococcus.[12] A systematic review it was found that renal parenchymal defects of their first diagnosed UTI are identified in 3 to 15 percent of children within one to two years. Long-term complications of UTI associated with renal scarring include, chronic renal failure, hypertension and toxemia

in pregnancy. Long term follow-up data are limited who had renal scarring from pyelonephritis during childhood, 23 percent developed hypertension and 10 percent developed end stage renal disease.[13,14] Greater risk of parenchymal defects is in children younger than two years than older children.[15] Reinfection is characterized by different pathogens reported on proper urine cultures in contrast to bacterial persistence. UTI commonly occurs due to peri-urethral colonization and by the fecal-perinealurethral route.[16,17]

Urinary tract infection pose a challenge to the physicians and microbiologists due to their progressive course, common reoccurrence, leading to serious complications and their increasing resistance to antibiotics.[18]

Several surveys have been signifying that bacteriuria in asymptomatic children of all age's group in children. It is now accepted that in any age group of children asymptomatic bacteriuria does not present a risk and is not indicated as screening for asymptomatic bacteriuria.[19,20]

The main aim is to study the distribution of uropathogens among the children suffering from urinary tract infection.

MATERIAL AND METHODS

The present study was carried out in the Department of Microbiology during Nov 2013 to Jan 2015 Hospitalized and OPD patients of ages below 15 years, either sexes, with a clinical diagnosis of UTI were included in the study.

Total 100 patient's urine samples were collected and process in the Department of Microbiology laboratory. The midstream, clean catch specimens of urine were collected in sterile universal container from both hospitalized and OPD patients with clinical diagnosis of UTI. Urine from urethral catheterization obtains from children who are not able to toilet and obtaining clean-catch urine when the child voids. Urine specimens were screened for significant bacteriuria by following screening tests:

a. Rapid urine tests (also known as dipsticks or macroscopic urinalysis)
b. Wet Film Examination
c. Triphenyl Tetrazolium chloride reduction test (TTC test)
d. Gram Staining

Total 100 Urine specimens were process, which are clinically diagnosed UTI patients were subjected to culture for identification of different micro-organisms.

For inoculation of urine sample calibrated bacteriological loop (calibrated to 1µl) was used to the culture media (Blood agar and MacConkey agar).

All bacteria are identified by routine standard technique as virulence characteristics of uropathogenic *E. coli:* For this procedure we are followed haemagglutination test and detection of hemolysin production.

Interpreting statistical urinalysis

Sensitivity, specificity, positive and negative predictive value were calculated according to the following formulae:

1. Specificity = True negative/ (True negative + false positive) the probability that the screening test will be negative in patients without urinary infection (negative culture).
2. Sensitivity = True positive/ (True positive + False negative), the probability that the screening test will be positive in patients with urinary infection (positive culture).
3. Negative predictive value = True negative/ (True negative + False negative), the probability that a urinary tract infection is not present when the screening test is negative.
4. Positive predictive value = True positive/ (True positive + false positive), the probability that urinary infection is present when the screening test is positive.

True positive stands for (Screening test & culture both positive), False positive stands for (Positive screening test & negative culture), True negative stands for (Screening test & culture both negative) & False negative stands for (Screening test negative & culture positive).[21]

Antimicrobial susceptibility test was performed by using Kirby Bauer disc diffusion method by following the Clinical Laboratory Standards Institute (CLSI) guidelines.[22]

OBSERVATIONS AND RESULTS

The study was carried out in the Department of Microbiology, from Nov 2013 to Jan 2015. Urine samples from total 118 clinically diagnosed UTI patients were included in this study. Of the total 100 positive samples 60 samples were collected from OPD patients and 40 were collected from hospitalized patients.

Age and sex distribution of the patients with UTI is shown in Table 1. It shows that, UTI was more common in females 60(60%) cases as compared to 40(40%) males. In females age group 10-15 years 37(61.7%), majority of patients, followed by age group of 5-10years 23(38.3%), while in males the infection is more frequently encountered in the age group10-15 21(52.5%).

Table 1: Age and sex distribution of UTI cases.

Age group (year)	Male (%)	Female (%)	Total (%)
5-10	19(47.5)	23(38.3)	42(42)
10-15	21(52.5)	37(61.7)	58(58)
Total	**40(40)**	**60(60)**	**100**

Table 2: Culture positive among OPD and Hospitalized patients.

Patients	Culture positive (%)
OPD	60(60)
Hospitalized	40(40)
Total	100

Of the total 100 significant growth samples, was detected in which 60(60%) were from the OPD patients and 40(40%) were from the hospitalized patients.

Table 3: Screening Tests.

Test	Positive samples (%) n=100
TTC	17(17)
Microscopy	20(20)
Gram Stain	63(63)

Table 3 shows results of various screening tests. It is observed that out of total 100 samples, TTC positive were 17(17%), pus cells were seen in 20(20%) samples on microscopy, whereas organisms were found in 63(63%) samples on Gram staining.

Table 4: Correlation of culture with wet film microscopy.

Culture	Microscopy		Total
	Positive	Negative	
Positive	41	29	70
Negative	30	18	48
Total	71(60.2)	47(39.28)	118

Of the total 118 microscopy samples, 41 were both microscopy as well as culture positive, while 18 samples were both culture as well as microscopy negative. 30 samples show negative in microscopy but positive in culture as shown in table 4.

Table 5: Correlation of culture with Gram stain.

Culture	Gram stain		Total
	Positive	Negative	
Positive	50	9	59
Negative	17	24	41
Total	67(67%)	33(33%)	100

Of the total 100 positive samples, 50 were both Gram stain as well as culture positive while 24 samples were both culture as well as Gram stain negative showed in table 5.

Table 6: Distribution of uropathogens among OPD and hospitalized patients.

Organism	Inpatient (%) N=60	Outpatient (%) N=40	Total (%) N= 100
Gram negative bacilli	**50(83.3)**	**25(62.5)**	**75(75)**
E.coli	35(58.3)	11(27.5)	46(46)
K. aerogenes	1(1.7)	1(2.5)	2(2)
K. pneumonia	6(10)	3(7.5)	9(9)
P. aeruginosa	5 (8.3)	6(15)	11(11)
P. mirabilis	1(1.7)	2(5)	3(3)
P. valgaris	1(1.7)	1(2.5)	2(2)
C. koseri	1(1.7)	0(0)	1(1)
C. freundii	0(0)	1(2.5)	1(1)
Enterobacter spp.	0(0)	0 (0)	0(0)
Gram positive Cocci	10(16.7)	15(37.5)	25(25)
S. aureus	3(5)	9(22.5)	12(12)
S. saprophyticus	6(10)	4(10)	10(10)
S. epidermidis	1(1.7)	1(2.5)	2(2)
Enterrococcus spp.	0(0)	1(2.5)	1(1)

Of the 100 cultures positive. Distribution of uropathogens between OPD and hospitalized patients is shown in table 7. It is observed that the maximum no. of bacterial isolates were from hospitalized patients, 60(60%) as compared to OPD patients, 40(40%) as shown in table 6.

DISCUSSION

Total of 118 OPD and hospitalized patients with the clinical diagnosis of UTI in which 100 positive sample were studied in which females 60(60%) cases were more frequently infected as compared to 40(40%) males.[23] On the other hand it was observed that, TTC positive were 17(17%), pus cells were seen in 20(20%) samples on microscopy, whereas organisms were found in 63(63%) samples on Gram staining.[24,25]

In this study there is highest prevalence, this is due high UTI among pediatrics patients in over study was probable inclusion of inpatient and outpatient. This prevalence was comparable to many other studies conducted worldwide.[26,27]

Our study showed UTI was more common in females than male patients which were similar to other studies. Several studies in pediatrics reported female predominance, depending upon the difference in age groups and different sample size being studied.[28,29,30] Reason behind low percentage of UTI among males was longer course of urethra and bacteriostatic secretion by prostate gland which was also supported by our study.[31,32] Prevalence of E.coli and Klebsiella was high in females, which was similar to study conducted by SpahiuL et.al.[33] Although E. coli, Klebsiella were the most principal uropathogens in our study, there were other pathogens due to their resistance pattern like, Pseudomonas, Proteus, Staphylococcus, Acinetobacter and Enterobacte. As E.coli and klebsiella has high

resistance in these pathogen which was similar to other studies.[32,33,34]

In gram positive pathogen, S. pyogens were most isolated from females even though the prevalence of these isolates was low. Therefore there must be regular monitoring on their prevalence and resistance pattern to implicate treatment policy. Predominant pathogen in gram positive isolates was Staphylococcus species respectively S. aureus, CoNS (S. saprophyticus and S. epidermidis) and Enterrococcus species (25) were isolates.[35]

CONCLUSION

Urinary tract infections are most common infections in the pediatric population. Pediatric UTI may lead to significant acute morbidity and irreversible renal damage if not treated promptly and appropriately. Children have a wide variety of clinical presentation which ranging from the asymptomatic presence of bacteria in the urine to potentially life-threatening infection.

This study reports the etiologic agents of UTI, most common symptoms in UTI patient. It is important for clinician in order to facilitate the treatment and management of patients with symptoms of UTIs. Therefore, this data will also help to formulate management policies of patients with UTI.

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