Clinical and Bacteriological profile of urinary tract infection in children at Nepal Medical College Teaching Hospital

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ABSTRACT

The aim of this study was to study the clinical and bacteriological profile of urinary tract infection (UTI) in children. This was a prospective study of 40 culture positive cases of UTI in children who attended pediatric outpatient department of Nepal Medical College Teaching Hospital. UTI was more common in female (65.0%) than in male (35.0%). Half were in the age group 1- 5 years. Fever was the most common presentation (65.0%) followed by abdominal pain (42.5%), decreased appetite (37.5%) and dysuria (37.5%). *Escherichia coli* was the most common (67.5%) bacterial isolate followed by *Klebsiella* sps (20.0%) and *Proteus sps* (10.0%). *E. coli* was 100 % sensitive to nitrofurantoin. *E. coli* was also highly sensitive to ofloxacin, cefotaxim and amikacin (94.0%). *Klebsiella* was 100 % sensitive to ciprofloxacin and amikacin. Greater degree of resistance was seen to ampicillin, cotrimoxazole and nalidixic acid.

Keywords: Urinary tract infection, bacterial isolates, antibiotic susceptibility.

INTRODUCTION

Urinary tract infection (UTI) is one of the most common bacterial infections seen in children.[1] It is estimated that at least 1% of boys and 3% of girls develop urinary tract infection during first ten years of life.[1] UTI is mainly due to the ascending infection from the urethra. The diagnosis of UTI in young children is important as it may be the marker of urinary tract abnormalities. Early diagnosis is important to preserve renal function of the growing kidney.[2] UTI is one of the most important risk factor in development of renal insufficiency or end stage renal disease.[3]

This study was undertaken to know the clinical and bacteriological profile of urinary tract infection in children in Nepal Medical College Teaching Hospital which is located in north eastern part of the Kathmandu valley.

MATERIALS AND METHODS

This was a prospective study done in Nepal Medical College Teaching Hospital from April 2008 to April 2009. Children aged 2 months to 15 years attending pediatric outpatient department with symptoms like fever, abdominal pain, dysuria, smelly urine were subjected for urine routine and microscopic examination. Verbal consent was taken from the parents or guardians before enrolling them in the study. Those with WBC more than 5 per high power field were then sent for urine culture and sensitivity. Specimen was collected by clean catch mid stream technique after cleaning the perineal area and sent to the clinical laboratory. Forty cases with positive urine cultures were included in the study. Samples with mixed growth were excluded from the study. History and clinical examination and findings of culture sensitivity were recorded in a preformed chart and then analyzed.

RESULTS

Out of the 40 culture positive cases, 14 (35.0%) were male and 26 (65.0%) were female making male to female ratio of 1:1.8 (Fig. 1). Agewise, 20 (50.0%) cases were in the age group 1 to 5 years (Table-1).

Majority of these patients had fever (65.0%). Other clinical features were abdominal pain (42.5%), decreased appetite (37.5%), dysuria /increased frequency (37.5%) (Table-2). Out of the 40 cases, *Escherichia coli* was isolated in 27 (67.5%) followed by *Klebsiella* sps in 8 (20.0%), *Proteus* sps in 4 (10.0%) and *Pseudomonas* sps in 1 (2.5%) (Fig 2). Most of the organisms were highly sensitive to nitrofurantoin and amikacin. Sensitivity to quinolones and third generation cephalosporins varied according to the organism. *E. coli* was 100 % sensitive to nitrofurantoin. *E. coli* was

Table-1: Age and sex distribution of UTI

SEX	2 Month to 1 Yr	1 to 5 Yrs	6 to10 Yrs	> 10 Yrs
Male	3 (50.0%)	8 (40.0%)	3 (27.3%)	0
Female	3 (50.0%)	12 (60.0%)	8 (72.7%)	3 (100%)
Total	6 (15.0%)	20 (50.0%)	11 (27.5%)	3 (7.5%)

Table-2: Clinical features of UTI in children

Clinical Features	n.	%
Fever	26	65.0
Abdominal pain	17	42.5
Decreased appetite	15	37.5
Dysuria/increased frequency	15	37.5
Nausea/vomiting	8	20.0
Smelly urine	7	17.5
Irritability	7	17.5
Failure to thrive	6	15.0
Loose stool	2	5.0

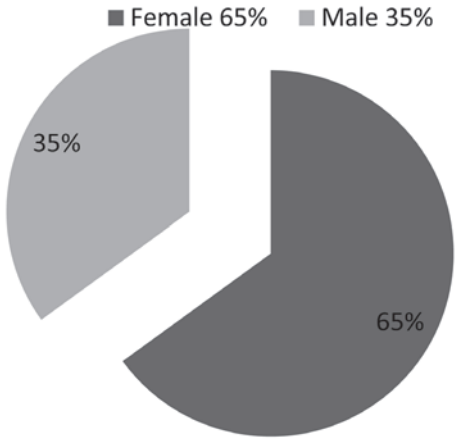

Fig. 1. Sex distribution of UTI

sensitive to ofloxacin, cefotaxim and amikacin in 94.4%, 94.7% and 94.7 %, respectively. *E. coli* was resistant to ampicillin in 91.6 %, cotrimoxazole in 66.6% and nalidixic acid in 63.6 %. *Klebsiella* sps was 100% sensitive to ciprofloxacin and amikacin where as 100 % resistant to ampicillin. *Proteus* sps was 100% sensitive to ofloxacin, norfloxacin, nitrofurantoin and amikacin where as it was 100% resistant to nalidixic acid (Table 3).

DISCUSSION

In our study, UTI was more common in female children. Male: female ratio was 1:1.8. Other such studies also showed male: female ratio of 1:1.9 [4,5] and 1:2.[6] This can be easily attributed to short urethra in female.

Fever was present in two third of the patients and abdominal pain in almost half of them. Fever was one of the major presentations in other studies too.[6-8] Features like loose stool (14.3%), febrile seizures (13.0%), haematuria (10.7%), hepatospleenomegaly (7.1%) were also seen in a study done in Manipal College of Medical Sciences, Pokhara.[6] The varied clinical features in their study could be due to inclusion of both inpatient and outpatient and also because of large sample size.

E. coli was the most common organism isolated (67.5%) in our study. This was in accordance with other studies in which *E. coli* was isolated from 61.0% to 72.8%.[4,7,9-12] However, Yüksel *et al* and Chakupurakal *et al* reported a very high percentage (87.0%) [13] and (92.0%) [14] of *E. coli* in their study. *Klebsiella* was isolated in 20.0% cases in our study. A study done in Aligarh, India by Akram *et al* showed similar data (22.0%).[4] Similar finding was also noted by different authors in studies done in various parts of the world where *Klebsiella* was isolated in 23.1%,[10] 15.7%[15] and 16.6%.[16] *Proteus* was the third isolate in our study occupying 10.0 % of the total isolate. Different studies have shown the growth of *Proteus* in urine from 5.8% to 12.4 %.[5,10,11] *Pseudomonas* was isolated in only one case (2.5%) in our study. The very low growth of *Pseudomonas* could be attributed to the fact that all these cases were from outpatient department and *Pseudomonas* is more commonly acquired as nosocomial infection.

In our study, most of the organisms isolated were highly sensitive to nitrofurantoin, amikacin, ofloxacin and cefotaxim. Among these, *E. coli* showed sensitivity to nitrofurantoin in 100.0% and to cefotaxim, amikacin and ofloxacin at the rate of over 94.0%. *E. coli* was resistant to ampicillin in 91.6% and cotrimoxazole in 66.6%. A study done in Turkey also reported highest sensitivity of nitrofurantoin (97.8%) against *E. coli* .[13]Antibiotic susceptibility pattern of our study matched with other study where *E. coli* was more than 80% sensitive to amikacin, cefotaxim and nitrofurantoin.[7] Other studies done in

Table-3: Antibiotic susceptibility pattern of *E. coli* (n=27)

Antibiotic	No. of isolates tested	No. of sensitive (%) isolates		No. of resistant (%) isolates	
Cefotaxim	19	18	(94.7%)	1	(5.3%)
Ofloxacin	18	17	(94.4%)	1	(5.5%)
Norfloxacin	21	15	(71.4%)	6	(28.5%)
Nitrofurantoin	22	22	(100%)	0	0
Nalidixic acid	22	8	(36.3%)	14	(63.6%)
Ciprofloxacin	19	16	(84.2%)	3	(15.7%)
Amikacin	19	18	(94.7%)	1	(5.2%)
Ampicillin	12	1	(8.3%)	11	(91.6%)
Cotrimoxazole	18	6	(33.3%)	12	(66.6%)

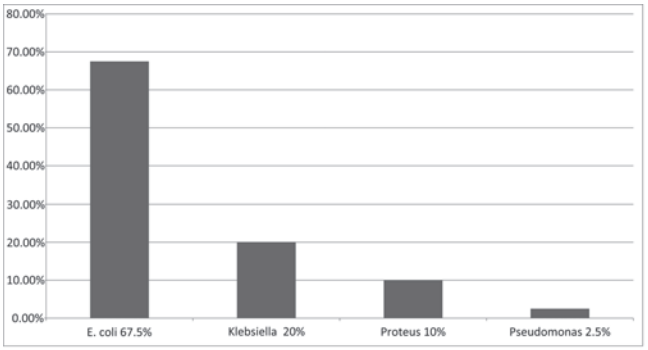

Fig. 2. Bacterial isolates in UTI

Greece and United Kingdom also reported 95.6% [9] and 93.0 % [14] sensitivity of *E. coli* to nitrofurantoin respectively. In our study, *E. coli* was resistant to ampicillin (91.6%), cotrimoxazole (66.6%) and nalidixic acid (63.6%). Various studies have also shown resistance of this organism to ampicillin. In one study done in Poland, *E. coli* was resistant to ampicillin in 56.8% and to cotrimoxazole in 23.1%.[17] In our study, *E. coli* was resistant to nalidixic acid in 63.6 %. In a former study done in the same instituition in 2001, *E. coli* was sensitive to ciprofloxacin in 95.2% followed by nalidixic acid (60.0%).[18] This may indicate the emerging resistance of organisms to common antibiotics.

Klebsiella showed 100.0% sensitivity to ciprofloxacin and amikacin and 83.3% sensitive to ofloxacin and nitrofurantoin in our study. *Klebsiella* was 100.0% resistant to ampicillin. This finding was comparable to the study done in one of the tertiary centers of eastern Nepal where *Klebsiella* and *Proteus* were 96.0% and 92.1% sensitive to amikacin.[19] In our study, *Proteus* was 100.0% sensitive to ofloxacin, norfloxacin, nitrofurantoin and amikacin where as 100.0 % resistant to nalidixic acid. Sensitivity of *Proteus* to these antibiotics was much lower in one study where *Proteus* was sensitive to nitrofurantoin and norfloxacin in 33.1% and 25.0% respectively.[19] Only one case of *Pseudomonas* (2.5%) was isolated in our study and it was sensitive to amikacin and nitrofurantoin whereas resistant to ampicillin, nalidixic acid and cefotaxim. This was comparable to other studies where *Pseudomonas* was isolated in 2.1% [6] and 3.5% [12] respectively.

As the UTI in children usually presents with non-specific features, it demands the urine test for the diagnosis. *E. coli* being the commonest bacteria and exhibiting the changing drug resistance pattern, it is advisable to perform the antibiotic susceptibility testing as well. Though, our data is small, it suggests providing treatment only after the proper microbiological investigations. However, norfloxacin, ofloxacin and amikacin can be started as empirical therapy after sending urine culture and sensitivity.

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