



Clinical features of urinary tract infection among children in a tertiary care hospital

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Abstract:

Introduction: It is estimated that at least 1% of boys and 3% of girls develop urinary tract infection during first ten years of life. To study the symptomatology and presenting features of the UTI in children, because of the vagueness of the urinary tract infections as they manifest in infants and children. **Materials and methods:** All patients diagnosed as having urinary tract infection as proved by urine culture done twice, admitted into pediatric wards of Yashoda Hospital from March 2008 – June 2009 were included in the study. **Results:** A total of 60 patients were studied. Children < 2 years were 13. Children 2-5 years were 19. Children 5-12 years were 28.

Key words: Urinary tract infection, Antimicrobial susceptibility, Febrile children, Urine Culture

Introduction:

As accepted by many of the clinicians, the urinary tract infection is more common than often thought of and the problem is more so in the Pediatric practice. It is estimated that at least 1% of boys and 3% of girls develop urinary tract infection during first ten years of life [1].

The problems of reinfection and recurrence is more common in the Pediatric age group. The clinical symptomatology may be so confusing and varied that many a times the urinary tract infection is not thought of and is discovered when the urine is sent for culture as a routine or for other purpose. Although children with UTI tend to present with fever, it is often difficult on clinical grounds to

distinguish UTI from other febrile illness in developing countries [2, 3].

Majority of UTI in children result due to ascending infection, although hematogenous spread may be more common in the first year of life [4,5]. Recurrence of UTI is common in susceptible children. The renal cortex at the growing age is vulnerable to renal parenchymal damage resulting in morbidity not only in younger age but also at a later stage, which includes chronic renal failure. Early recognition and appropriate treatment of such children is essential in order to preserve renal function, prevent permanent damage, promote growth and development. The diagnostic evolution of children with UTI has undergone significant evolutionary changes, and noninvasive methods such

as ultrasonography and radioisotope imaging are becoming not only more accessible but also more reliable as investigation tools.

This study was undertaken to study the common clinical presentation of urinary tract infections in children, to know the age and sex pattern of children suffering from urinary tract infections, to know about the causative organisms and to study the radiologic abnormalities seen in urinary tract infections in children.

Materials and Methods

All patients diagnosed as having urinary tract infection as proved by urine culture done twice, admitted into pediatric wards of Yashoda Hospital from March 2008 – June 2009 were included in the study.

A detailed history regarding clinical symptomatology, predisposing factors, risk factors were taken. Detailed clinical examination including genital examination and inspection of back for sacral dimpling or other abnormalities was done. Once the urine culture was positive the child was started on appropriate antibiotics according to sensitivity pattern in the culture.

Collection of sample for all children was done by clean catch mid stream urine sample. Mother was instructed regarding collection of the sample and was emphasized about the need for collection of such a sample. After 24 hours second sample was sent in a similar manner.

All cultures, which were positive in both the samples were taken into the study. Cultures which came as mixed growth were not taken into the study. Simultaneously urine was sent for complete urine examination and blood was drawn for serum creatinine and urea.

All children with urine culture positive and less than 2 years of age (both boys and girls) were investigated further with ultrasonography, Micturating Cystourethrogram (MCUG) and radio nucleide scan (DMSA). MCUG was done after one week of antibiotics under cover of antibiotics. All cases with VUR Gr-III and above were sent for Pediatric surgery follow up also.

All children between 2-5 years were also investigated further with Ultrasonography, MCUG, DMSA. All children more than 5 years were investigated further with Ultrasonography. In boys > 5 years MCUG and DMSA was also done. In girls who were > 5 years MCUG and DMSA was done only if there was a strong suspicion in favour of Pyelonephritis.

Incidence and pattern of clinical features was studied in all the age groups i.e. <2 years, 2-5 years, 5-12 years. Imaging studies were also compared in different age groups.

Results:

A total of 60 patients were studied.

Children < 2 years were 13.

Children 2-5 years were 19.

Children 5-12 years were 28.

Sex distribution:

18 children (30%) were boys & 42 (70%) children were girls. In <2 years age group total no of cases were 13. Boys formed 69.2% of cases & girls formed 30.7%.

In the 2-5 years age group total no of cases were 19. Boys formed 21% of total cases in this age group & girls formed 78.9%.

In the 5-12 years age group total no of cases were 28. Girls and formed 82.1% of total cases & boys formed 17.8%.

Table 1: Age and Sex Distribution

Sex	<2 years	2-5 years	5-12 years	Total
Male	9	4	5	18(30%)
Female	4	15	23	42(70%)
Total no of cases	13	19	28	60

Table 2: Analysis of Clinical features:

The predominant presenting complaint in all age groups (i.e < 2 years, 2-5 years, 5-12 years) was fever without any focus of duration more than 3 days. This complaint formed 26.6% of all the presenting features. The fever was associated with other symptoms like:

- Vomitings 11.6%
- Abdominal pain 10%
- Suprapubic pain 5%
- Facial puffiness 8.3%
- Frequency 11.6%
- Urgency 8.3%
- Dysuria 11.6%
- Hematuria 6.6%
- Pyuria 6.6%
- Dribbling 1.6%
- Chronic fever 10%
- Diarrhea 1.6%

Blood pressure:

In 6.6% of cases blood pressure was found to be raised. All these cases had DMSA scan abnormalities in the form of renal scars and acute pyelonephritic foci. These patients also had biochemical abnormalities in the form of raised blood urea and serum creatinine.

Investigations:

Complete urine examination showed pus cells in 31 cases and RBC's in 6.6% of cases. Biochemical abnormalities found were raised blood urea and serum creatinine in 6.6% of cases. 6 cases of nephrotic syndrome showed other biochemical abnormalities like raised serum cholesterol, decreased serum albumin, albuminuria, increased protein in 24 hour urinary protein excretion, abnormal serum electrolytes. One case with renal tubular acidosis showed hypokalemia and acidosis on ABG.

Infective organism and sensitivity pattern:

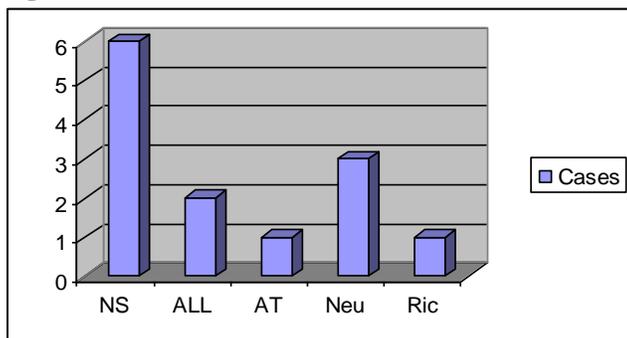
E coli was the predominant organism in all age groups. Cultures in 54 cases showed predominantly growth of E coli, which formed 90% of organisms isolated.

Microbiology

Most of the organisms were sensitive to fluoroquinolone, cephalosporins mainly ceftriaxone & cefotaxime, amikacin gentamycin. Recurrent UTI showed isolation of organisms resistant to most of the antibiotics but they were sensitive to amikacin.

Table 3:

Organisms	Cases	Percentages
E coli	54	90%
Proteus	2	3.3%
Klebsiella	2	3.3%
Streptococcus	2	3.3%

Figure 1: Associated Illnesses

ALL - Leukemia

Neu - Neurological Condition

NS - Nephrotic Syndrome

AT - Abdominal Tumor

Ric - Rickets

Radiological Features

Ultrasonography abnormalities were seen in 28 cases. 28.5% of which was cystitis and urinary bladder changes, which formed the predominant abnormality. 25% was hydronephrosis, 21.4% was parenchymal abnormality as increased echogenicity of cortex.

U/S Abnormalities**Table 4:**

U/S Abnormalities	No. of cases
Hydronephrosis	7(25%)
Cystitis changes	8(28.5%)
Increased echogenicity of cortex	6(21.4%)
Pelvic – ureteric - junction obstruction	2(7.1%)
Calculi	1(3.5%)
Agenesis	1(3.5%)

Discussion:

In this study males were predominant in < 2 years age group and formed 69.25% of cases in this group. According to study done by Ranganathan et al maximum number of urinary tract infections were in the age group of 1-5 Years [6]. Male children were predominant in the age group of 1-2 girls were predominant after > 2 Years.

Female predilection was seen in the age group >2Years upto 12 Years in this study 63.3%. Foxman et al observed that incidence of UTI in girls was more in > 1 Yr age group with a peak in 3-6 Years [7].

Predominant clinical presentation was fever with out any localizing signs in all age groups in this study and formed 26.6% of all clinical features. Hoberman observed that fever of > 3 days without focus was the presentation of UTI in 30% of febrile children presenting in OPD and emergency department [8].

Non specific symptoms were common in < 5 Years age group and formed 28.1% of all Clinical features. The non specific symptoms included were vomitings 11.6%, abdominal pain 10%, suprapubic pain 5%, facial puffiness 5%. Most common urinary symptom was increased frequency followed by dysuria. Heptinstall et al reported non specific symptoms as most common presentation (35%) [9].

According to study done by Ranganatham et al fever was the commonest symptom (86.6%), other symptoms were pallor 53.4%, loose motions and vomitings [6]. Most common urinary complaint was increased frequency (41%) followed by dysuria (27.2%).

The most common organism isolated in culture was E coli (90%). E coli was the predominant organism isolated in studies done by Struthers et al (82%) [10]. Second most common organism isolated in this study was Klebsiella (3.3%) and was seen more commonly in recurrent UTI. Prais et al [11] found proteus to be the second most organism isolated.

E.coli was susceptible to Flouroquinolones, Cephalosporins and Aminoglycosides in most of the cases. In recurrent UTI E.coli isolated was resistant to Quinolones and Cephalosporins. It was sensitive to Aminoglycosides especially to Amikacin.

Complete urine examination showed pus cells in 31% of cases and RBC's and 6.6% of cases. Biochemical abnormalities like increased blood urea and serum creatinine was seen in 10% of cases. Craig et al showed biochemical abnormalities in 3% of febrile UTI cases [12].

Vesicoureteric reflux (VUR) was seen in 20% of cases. Gr II & Gr III VUR was more common in the study. VUR was cause of recurrent UTI in 66.6% of cases presenting with recurrent UTI. Bergstrom found VUR in 40% of cases with UTI [13]. They also reported that 80% of recurrent UTI was due to VUR.

Ultrasound was abnormal in 46.6% of cases. Most common ultrasound abnormality found was cystitis and internal echoes in urinary bladder (28.5%). Hydronephrosis was seen in 25% of cases.

DMSA was abnormal in 34.3% of cases. Analysis of DMSA scan was done in children <5 Years only, as DMSA scan was not done in all patients >5 Years.

In 92.9% of cases with febrile UTI, according to study done by Namalwar et al [14]. They also reported that DMSA was very sensitive in detecting acute pyelonephritis. Such an association was not found in this study.

All the cases which showed DMSA scan abnormalities also showed ultrasound to be abnormal. Abnormal DMSA scan alone without abnormal ultrasound was not found in this study. Ultrasound and DMSA were abnormal in 11 cases (34.3%).

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