



## Study of Clinical Profile in Urinary Tract Infections in 1-12 Years Childrens.

### KEYWORDS

Urinary tract infection, clinical profile, 1-12 years children.

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### ABSTRACT

**Introduction:** Urinary tract infection (UTI) is one of the most common childhood bacterial infections, after upper respiratory tract and middle ear infections<sup>1</sup>. The true incidence of urinary tract infections in children is difficult to estimate. The risk of developing UTI before the age of 14 years is approximately 1% in boys and 3-5% in girls<sup>2</sup>. The incidence varies with age. During the first year of life, the male to female ratio is 3-5:1. Beyond 1-2 years, there is female preponderance with male to female ratio of 1:10. Hence the study is taken up to find the clinical profile of UTI in pediatric population. **Aims & Objectives:** 1.To study clinical manifestations of urinary tract infections in childhood & 2.To study the laboratory profile of urinary tract infections in childhood. **Material & methods:** This hospital based cross sectional study was conducted in pediatrics department of tertiary care centre from Jan 2013 to June 2015. The study group includes children attending the pediatric OPD and IPD with following inclusion and exclusion criteria. Inclusion criteria: 1. Patient suspected of UTI by positive urinary tract symptoms, signs and/or significant pyuria on urinalysis and later confirmed after admission in pediatric ward in our institution by a positive urine culture. 2. Patients already diagnosed outside for urinary tract infections by positive urine culture and urine analysis admitted in pediatric wards. 3. Age group 1-12 years. **Exclusion criteria:** 1: Children attending outpatient department only. 2: Age group < 1 years & >12 years. **Observation & Results:** The study group includes 150 patients who were diagnosed as case of UTI by positive urine culture and satisfying the inclusion criteria. In present study out of 150 children with UTI, 103 were females and 47 were males with male to female ratio of 1:2.2. The largest number of patients 82(54.67%) fell into the 1-5 years age group, followed by 53(35.34%) patients which fell in the 5-10 years age group, 15 (10%) cases fell in 10-12 years age group. The most common symptom in the present study was fever in 107(71.33%) followed by dysuria in 82(54.66%) cases, abdominal pain in 58(38.67%) cases, vomiting in 56(37.34%) cases, frequency of micturition and loss of appetite in 52(34.67 %) cases, irritability in 37(24.67%) cases, chills and rigors in 32(21.34%) cases, decreased urine output in 31(20.67%) cases, passing high coloured urine in 29(19.34%) cases, burning micturition in 20(13.33%) cases, failure to thrive in 14(9.34%) patients, diarrhea in 11(7.34%) patients, nocturnal enuresis in 10(6.67%) patients, dribbling of urine and foul smelling urine was found in 5(3.34%) patients and hematuria in 2(1.34%) cases. In present study on urine analysis, 5 to 10 pus cells/ hpf were found in 44(29.33%) patients, 51(34%) have 10-15 pus cells and plenty of pus cell were present in 55(36.66%) patients. In the present study, commonest organism in urine culture was E. coli in 102(68%) cases followed by klebsiella in 18(12%) patients, Proteus in 7(4.67%) cases, Staphylococcus aureus in 6(4%) patients, Pseudomonas aeruginosa, streptococcus faecalis and enterobacter species were present in 4(2.66%) cases, Acinetobacter species in 3(2%) & Citrobacter and candida albicans were found in 1(0.67%) case. Simple UTI was present in 96(64%) patients, Complicated UTI in 13(8.67%), Recurrent UTI in 22(14.67%) patients & Asymptomatic bacteriuria in 19(12.67%) patients. **Conclusion:** UTI should be considered as a potential cause of fever in children. As the febrile children with UTI usually present with nonspecific signs and symptoms, urine culture should be considered as a part of diagnostic evaluation. Urine microscopy significantly improves the reliability of microscopic urinalysis for detection of UTI for pyuria. However, positive results neither detect all patients with UTI nor the negative test completely rules out infection. Hence, urine culture is the gold standard for diagnosis of UTI in children.

### INTRODUCTION

Urinary tract infection (UTI) is one of the most common childhood bacterial infections, after upper respiratory tract and middle ear infections<sup>1</sup>. The true incidence of urinary tract infections in children is difficult to estimate. The risk of developing UTI before the age of 14 years is approximately 1% in boys and 3-5% in girls<sup>2</sup>. The incidence varies with age. During the first year of life, the male to female ratio is 3-5:1. Beyond 1-2 years, there is female preponderance with male to female ratio of 1:10. Infection of the urinary tract is identified by growth of a significant number of organisms of a single species in the urine in the presence of symptoms. It is the presence of more than 100,000 cfu/ml after doing urine culture, regardless to symptoms<sup>3</sup>. Urinary tract infections are categorized into either lower

tract infection, located in the bladder and/or urethra (cystitis and urethritis), and upper tract infection, located in the ureters, collecting system, and parenchyma (pyelonephritis)<sup>4</sup>.

### MATERIAL & METHODS

This hospital based cross sectional study was conducted in pediatrics department of tertiary care centre from Jan 2013 to June 2015. The study group includes children attending the pediatric OPD and IPD with following inclusion and exclusion criteria. **Inclusion criteria:** 1. Patient suspected of UTI by positive urinary tract symptoms, signs and/or significant pyuria on urinalysis and later confirmed after admission in pediatric ward in our institution by a positive urine culture. 2. Patients already diagnosed outside for urinary

tract infections by positive urine culture and urine analysis admitted in pediatric wards. **3.** Age group 1-12 years. **Exclusion criteria: 1:** Children attending outpatient department only. **2:** Age group < 1 years & >12 years.

The study group include confirmed cases of UTI by positive urine culture were included in this study. A detail history, physical examination with baseline investigations like routine blood counts, renal function test, urine analysis and blood culture was carried out in all patients. Urine analysis included urine examination for protein, RBCs, albumin, microscopic examination for pus cells. Imaging studies with plain abdominal X-ray and renal ultrasound & other investigations such as liver function tests, serum electrolytes were done in the patients if required. The details were recorded in predesigned and pretested performa.

**OBSERVATION & RESULTS**

The present study was carried out at pediatrics department of tertiary care hospital from January 2013 to June 2015. There were 5796 admissions in pediatric ward and 19728 cases visited OPD with a sum of 25524 during study period. Amongst those 150 cases were diagnosed as a case of UTI by positive urine culture during study period, hence the prevalence of UTI in present study found was 0.58 %.

**Table 1: Age and Sexwise Distribution**

Age	To 5 years		5 To 10 years		10 to 12 years	
	No.	%	No.	%	No.	%
Male	32	39	15	28.3	0	0
Female	50	61	38	71.7	15	100
Total	82	54.67	53	35.34	15	10

In present study, out of 150 cases with UTI, 103 were females and 47 were males with male to female ratio of 1:2.2. 82(54.67%) cases fell into the 1-5 years age group, followed by 53 (35.34%) patients who fell in the 5-10 years age group & 15(10%) cases fell in 10-12 years age group. (Table 1)

**Table 2: Distribution of patients according to the presenting symptoms**

Symptoms	Number of cases (n = 150)	Percentage (%)
Fever	107	71.33
Dysuria (Pain during micturition)	82	54.66
Abdominal pain	58	38.67
Vomiting	56	37.34
Frequency of micturition	52	34.67
Loss of appetite	52	34.67

Irritability	37	24.67
Chills and rigors	32	21.34
Decreased urine output	31	20.67
Passing high coloured urine	29	19.34
Burning micturition (Burning sensation during micturition)	20	13.33
Failure to thrive	14	9.34
Diarrhea	11	7.34
Nocturnal enuresis	10	6.67
Dribbling of urine	5	3.34
Foul smelling urine	5	3.34
Hematuria	2	1.34

The most common symptom in the present study was fever in 107(71.33%) followed by dysuria in 82(54.66%) cases, abdominal pain in 58(38.67%) cases, vomiting in 56(37.34%) cases, frequency of micturition and loss of appetite in 52(34.67%) cases, irritability in 37(24.67%) cases, chills and rigors in 32(21.34%) cases, decreased urine output in 31(20.67%) cases, passing high coloured urine in 29(19.34%) cases, burning micturition in 20(13.33%) cases, failure to thrive in 14(9.34%) patients, diarrhea in 11(7.34%) patients, nocturnal enuresis in 10(6.67%) patients, dribbling of urine and foul smelling urine was found in 5(3.34%) patients and hematuria in 2(1.34%) cases. (Table 2)

**Table 3: Distribution of patients according to the presenting signs**

Signs	Number of cases (n=150)	Percentage (%)
Pyrexia	107	71.33
Pallor	52	34.67
Renal angle tenderness	28	18.67
Flank mass	28	18.67
Edema	8	5.34
Palpable bladder	24	16
Palpable kidney	20	13.34
Poor urinary stream	21	14
Hypertension	16	10.67
Ascites	2	1.34

The commonest sign in the present study found was py-

rexia in 107(71.33%) followed by pallor in 52(34.67%) cases, renal angle tenderness and flank mass in 28(18.67%), palpable bladder in 24(16%), poor urinary stream in 2(14%), palpable kidney in 20(13.34%), hypertension in 16 (10.67%) patients, edema in 8(5.34%) cases and ascites in 2(1.34%) cases. (Table 3)

**Table 4: Risk factors**

Risk factors	Number of cases (n = 150)	Percentage (%)
Uncircumcised boys	46	97.9
Wiping from back to front	16	10.67
Enuresis	10	6.67
Constipation	7	4.67
Perianal itching	2	1.33
Urethral instrumentation	2	1.33

Most common risk factor in the present study was the presence of foreskin in the males in 46(97.9%) patients ,while wiping from back to front was seen in females in 16(10.67%) patients. (Table 4)

**Table 5: Urine analysis for Pyuria**

Urine Microscopy for pus cells /hpf (uncentrifuged urine )	Number of cases (n=150)	Percentage (%)
5 to 10	44	29.33
10 to 15	51	34
Plenty	55	36.66

In present study on urine analysis, 5 to 10 pus cells/ hpf were found in 44(29.33%) patients, 51(34%) have 10-15 pus cells and plenty of pus cell were present in 55 (36.66%) patients. (Table 5)

**Table 6: Organism found in urine culture**

Organism isolated	Number of patients (n=150)	Percentage (%)
Escherichia coli	102	68
Klebsiella pneumonia	18	12
Proteus	7	4.67
Staphylococcus aureus	6	4
Pseudomonas aeruginosa	4	2.66

Streptococcus faecalis	4	2.66
Enterobacter species	4	2.66
Acinetobacter species	3	2
Citrobacter	1	0.67
Candida albicans	1	0.67

The commonest organism found in urine culture was E. coli in 102(68%) cases followed by klebsiella in 18(12%) patients, Proteus in 7(4.67%) cases, Staphylococcus aureus in 6(4%) patients, Pseudomonas aeruginosa, streptococcus faecalis and enterobacter species were present in 4(2.66%) cases, Acinetobacter species in 3(2%) & Citrobacter and candida albicans were found in 1(0.67%) case. (Table 6)

**Table 7: Case classification**

Type of UTI	Number of patients (n=150)	Percentage (%)
Simple UTI	96	64
Recurrent UTI	22	14.67
Asymptomatic Bacteriuria	19	12.67
Complicated UTI	13	8.67

Simple UTI was present in 96(64%) patients, Complicated UTI in 13(8.67%), Recurrent UTI in 22(14.67%) patients & Asymptomatic bacteriuria in 19(12.67%) patients. (Table 7)

## DISCUSSION

### Age Distribution:

In present study, out of 150 cases with UTI, 103 were females and 47 were males with male to female ratio of 1:2.2. The majority of diagnosed cases of UTI were in the age group of 1-5 years constituting 82(54.67%) cases followed by 53(35.34%) cases in age group of 5-10 years & 15(10%) cases fell in 10-12 years age group. **A Sharma et al (2011)**<sup>5</sup> in his study found 50.0% of patients of UTI in age group of 1 to 5 years followed by 27.5% of cases between 6 to 10 years age group which correlates with our study. **Singh SD et al (2013)**<sup>6</sup> in his study found maximum number of cases 64(47.4%) between 1 to 5 years which is similar to our study.

### Sex distribution:

In the present study 47(31.34%) patients were males and 103(68.67%) were females. The male to female ratio was 1:2.2 where females outnumbered males. After 1 year of age, UTI is far more common in girls than boys at all ages. This can be easily attributed to short urethra in female. In consensus statement of Indian Pediatric Nephrology Group it has been mentioned that during the first year of life, the male to female ratio is 3-5:1. Beyond 1-2 years, there is female preponderance with male to female ratio of 1:10<sup>100</sup>. In the study done by **Malla KK, et al (2008)**<sup>7</sup> male to female ratio was found to be 1:2. **Sharma et al (2011)**<sup>5</sup> in his study found male to female ratio of 1:1.8. According to **Manohar et al (2015)**<sup>8</sup> the incidence of UTI was significantly more common in girls than boys, the male to female

ratio being 1:4.8.

#### Clinical features:

The most common symptom in the present study was fever in 107(71.33%) followed by dysuria in 82(54.66%) cases, abdominal pain in 58(38.67%) cases, vomiting in 56(37.34%) cases, frequency of micturition and loss of appetite in 52(34.67%) cases, irritability in 37(24.67%) cases, chills and rigors in 32(21.34%) cases, decreased urine output in 31(20.67%) cases, passing high coloured urine in 29(19.34%) cases, burning micturition in 20(13.33%) cases, failure to thrive in 14(9.34%) patients, diarrhea in 11(7.34%) patients, nocturnal enuresis in 10(6.67%) patients, dribbling of urine and foul smelling urine was found in 5(3.34%) patients and hematuria in 2(1.34%) cases. Our finding is similar to many other studies such as those by **Shaw et al (1998)**<sup>9</sup> who found that apart from fever, abdominal pain and vomiting were the most common presenting features in children aged 1-5 years while dysuria, frequency of micturition and urgency were the most common symptoms in children older than 5 years of age. In a study done by **Anis-ur-Rehman (2008)**<sup>10</sup> on 375 children with culture positive UTI, fever was present in 91 % cases, 15% of cases had weak urinary stream, 12% of patients had altered urine colour and malodorous urine, lumbar tenderness was found in 22% of cases and palpable bladder in 9.5% of cases.

#### Urine analysis:

In present study on urine analysis, 5 to 10 pus cells/ hpf were found in 44(29.33%) patients, 51 (34%) have 10-15 pus cells and plenty of pus cell were present in 55(36.66%) patients. The predictive value of pyuria as an isolated feature is poor and it cannot be recommended for making a presumptive diagnosis of UTI. Our study included only culture positive cases of UTI of which E. coli was the most common organism isolated in 102(68%) cases followed by Klebsiella in 18(12%) cases. This was in concordance with other studies such as those by **Taneja et al (2010)**<sup>11</sup>, **A Sharma et al (2011)**<sup>5</sup> in which E. coli was isolated in 47% of cases and 67.5% of cases respectively. **Yuksel et al (2006)**<sup>12</sup> and **Chakupurakal et al (2010)**<sup>13</sup> reported a very high percentage of E coli 87.0% and 92.0% in their study. In study done by **Taneja N et al (2010)**<sup>11</sup> and **Karki A et al (2004)**<sup>14</sup> klebsiella was found in 15.6% and 16.6% cases respectively which correlate with our study.

#### CONCLUSION

UTI should be considered as a potential cause of fever in children. As the febrile children with UTI usually present with nonspecific signs and symptoms, urine culture should be considered as a part of diagnostic evaluation. Urine microscopy significantly improves the reliability of microscopic urinalysis for detection of UTI for pyuria. However, positive results neither detect all patients with UTI nor the negative test completely rules out infection. Hence, urine culture is the gold standard for diagnosis of UTI in children.

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