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To study the clinical profile of children (aged 1month-14yrs) suffering from urinary tract infection at tertiary care hospital Bikaner.

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Abstract

Background: Urinary tract infections (UTIs) are common bacterial infections in children. The diagnosis of UTI is very often missed in young children due to minimal and nonspecific symptoms.

Methods: Hospital based observational prospective study conducted at Department of Pediatrics, S.P. Medical College and P.B.M associated group of Hospital, Bikaner. Total 250 clinical cases were included.

Results: Maximum patients presented with abdominal symptoms (72%), urinary symptoms (23.2%), followed by respiratory symptoms in 18.0% cases, CNS symptoms (8.8%) and non-specific symptoms in 47.2% cases. Fever was the most common presenting complaint (148 cases) 59.2% followed by vomiting, pain abdomen, oliguria, Diarrhoea, generalized swelling, burning micturition, cough, decreased appetite, respiratory distress, excessive cry, chills and rigor, abnormal body movement, yellow colour of urine, headache while least common present history was chest pain and joint swelling where 1 case each was found.

Conclusion: UTI is a common childhood illness. Females were more commonly affected than males. Fever being most common presenting symptom followed by vomiting and pain abdomen.

Keywords: Urinary tract infections (UTIs), Females, Fever.

Introduction

Urinary tract infections (UTIs) are common bacterial infections in children. The diagnosis of UTI is very often missed in young children due to minimal and nonspecific symptoms. The developing renal cortex in young children is vulnerable to renal scarring resulting in hypertension and chronic renal failure. These morbidities in adults often have their origin in childhood. A clinically suspected case of UTI should be defined and documented with urine culture report. After the diagnosis of UTI, its category should be defined. This helps in guiding a clinician about the appropriate radio/nuclear imaging evaluation, choice of antimicrobial agent, duration of treatment and need of chemoprophylaxis. Even a single confirmed UTI should be taken seriously[1].

The risk of having a UTI before the age of 14 years is approximately 1-3% in boys and 3-10% in girls. Complications include renal parenchymal damage and renal scarring that can lead to hypertension and progressive renal insufficiency in later life. In children, UTI may be the first presentation of an underlying congenital anomaly of the urinary tract. Therefore rapid diagnosis, institution of early treatment and further evaluation by imaging modalities is important to preserve the function of the growing kidney[2].

Etiological agents of UTI are variable and usually depend on time, geographical location and age of patients. However, Escherichia coli, Proteus mirabilis, Enterobacter agglomerans, Citrobacter freundii and Klebsiella pneumonia account for over 70% of cases[3,4].

The aim of present study was to record the common clinical presentation of UTI at Tertiary level care teaching Hospital.

Materials And Methods

Study design: Hospital based observational prospective study.

Study place: Department of Pediatrics, S.P. Medical College and P.B.M associated group of Hospital, Bikaner

Sample size: Total 250 clinical cases were included.

Sampling Method: Convenience sampling.

Inclusion criteria: All children in the age group of 1month to14 years admitted in hospital with a probable diagnosis of urinary tract infection that is later confirmed by a positive urine culture.

Exclusion criteria: Infants below 1 month old were excluded.

Data Collection: Patients from the age of 1month to 14 years presenting with urinary symptoms (dysuria, urgency, frequency, incontinence, hematuria and suprapubic pain) and those with fever without focus were enrolled in the study. History was noted and children clinically examined. Complicated UTI (involvement of upper urinary tract) was diagnosed if there was presence of any one or all of the following- fever >39^0C, systemic toxicity, persistent vomiting, dehydration, renal angle tenderness and raised serum creatinine. Recurrent UTI was considered if there was a previous history of one or more episodes of proven UTI.

Data Analysis

To collect required information from eligible patients a pre-structured pre-tested Proforma was used. For data analysis statistical software SPSS was used and data were analyzed with the help of frequencies, figures, proportions, measures of central tendency, appropriate statistical test.

Observations

Table 1: Distribution of cases according to age and gender

Age Group (years)	Gender				Total	
	Female		Male			
	No.	%	No.	%	No.	%
<1	16	11.0	19	18.1	35	14.0
1-5	57	39.3	44	41.9	101	40.4
6-10	43	29.7	28	26.7	71	28.4
>10	29	20.0	14	13.3	43	17.2
Total	145	100	105	100	250	100

In present study, out of total 250 cases, majority of cases were between 1 to 5 years (40.4%) followed by 6-10 years (28.4%), more than 10 years (17.2%) and less than 1 year (14%).Male predominance over female below 1 year with male to female ratio 1:1.8, while above 1year females were affected more.

Table 2: Distribution of cases according to socioeconomic status

Socioeconomic Status	No. of Cases	%
Lower	11	4.4
Lower Middle	57	22.8
Middle	74	29.6
Upper Middle	65	26.0
Upper	43	17.2
Total	250	100

Out of total 250 cases, majority of patients i.e. 74(29.6%) were from middle socioeconomic status followed by 65(26%) belonged to upper middle socioeconomic status, 22.8% cases belonged to lower middle socioeconomic status, 17.2% cases belonged to upper socioeconomic status while 11(4.4%) were from lower socioeconomic status.

Table 3: Distribution of cases according to BMI

BMI	No. of Cases	%
<-2SD (underweight)	43	17.2
Normal	203	81.2
>2SD (overweight)	4	1.6
Total	250	100

According to BMI, 203(81.2%) cases had their BMI within normal range while 43(17.2%) and 4(1.6%) cases had their BMI less than -2SD and >2SD respectively.

Table 4: Clinical distribution of cases according to present history

Present History	No. of Cases	%
Fever	148	59.2
Abdominal Symptoms		
Vomiting	80	32.0
Pain abdomen	60	24.0
Diarrhoea	37	14.8
Constipation	3	1.2
Urinary Symptoms		
Oliguria	55	22.0
Burning Micturition	28	11.2
Yellow Colour of Urine	11	4.4
Frequent Urination	7	2.8
Haematuria	7	2.8
Respiratory Symptoms		
Cough	26	10.4
Respiratory Distress	19	7.6
CNS Symptoms		
Abnormal Body Movement	12	4.8
Altered Sensorium	5	2.0
Vertigo	5	2.0
Non-Specific		
Generalized Swelling	36	14.4
Decreased Appetite	20	8.0
Excessive Cry	18	7.2
Chills & Rigor	15	6.0
Headache	10	4.0
Groin Pain	6	2.4
Nausea	3	1.2
Not Gaining Weight	3	1.2
Skin Lesion	3	1.2
Leg Pain	2	0.8
Chest Pain	1	0.4
Joint Swelling	1	0.4

According to presenting history, maximum patients presented with abdominal symptoms (72%), urinary symptoms (23.2%), followed by respiratory symptoms in 18.0% cases, CNS symptoms (8.8%) and non-specific symptoms in 47.2% cases. Fever was the most common

presenting complaint (148 cases) 59.2% followed by vomiting, pain abdomen, oliguria, Diarrhoea, generalized swelling, burning micturition, cough, decreased appetite, respiratory distress, excessive cry, chills and rigor, abnormal body movement, yellow colour of urine, headache while least common present history was chest pain and joint swelling where 1 case each was found.

Table 5: Distribution of cases according to type of UTI

Age Group (years)	Simple		Recurrent		Complicated	
	Male	Female	Male	Female	Male	Female
<1	14	14	1	0	4	2
1-5	37	47	3	4	4	6
6-10	23	38	3	2	2	3
>10	9	24	2	3	3	2
Total	83	123	9	9	13	13

According to type of UTI, Simple UTI was found in 206(82.4%) cases, 26(10.4%) cases had complicated UTI while recurrent UTI was found in 18(7.2%) of cases. In age group 1 to 5 year recurrent and complicated UTI was more common.

Table 6: Stratified distribution of cases according to complicated UTI

Stratified Findings	No. of Cases	Percentage
Hydronephrosis	4	15.4
Renal Calculi	6	23.1
PUV	4	15.4
CKD	3	11.5
Cystitis	3	11.5
Left Ectopic Kidney	1	3.8
Pyelonephritis	5	19.3
Total	26	100

According to above table, complicated UTI seen in 26 cases, out of which hydronephrosis in 4(15.4%), renal calculi in 6(23.1), PUV in 4(15.4%), CKD and cystitisin 3(11.5%) cases each while pyelonephritis in 5(19.3%) cases and left ectopic kidney in 1(3.8%) case was seen.

Table 7: Distribution of cases according to associated co-morbidities

Associated co-morbidities	No. of Cases	%
Acute Diarrhoeal Disease	37	14.8
Nephrotic syndrome	36	14.4
ARI	26	10.4
Neurological Disorders	12	4.8
Infective hepatitis	11	4.4
Type 1 diabetes mellitus	9	3.6
Chronic kidney disease	8	3.2
Failure to thrive	3	1.2

According to associated comorbidity, Acute diarrhoeal disease was the most common where total 37(14.8%) cases were found followed by Nephrotic syndrome 36(14.4), ARI(10.4%), neurological disorder (4.8%), infective hepatitis (4.4%), type 1 diabetes mellitus (3.6%), chronic kidney disease (3.2%) and failure to thrive (1.2%).

Discussion

In present study, out of total 250 cases, majority of cases were between 1 to 5years (40.4%) followed by 6-10 years (28.4%), more than 10 years (17.2%) and less than 1 year (14%). Male predominance over female below 1 year with male to female ratio 1:1.8, while above 1year females were affected more.

UTI was more common in children of 1-5 age groups. Ineffective toilet training and the resultant ascending infection from urethra may be predisposing children of this age group for UTI. In consensus statement of Indian Pediatric Nephrology Group, it has been mentioned that during the first year of life, male to female ratio is 3-5: 1, beyond 1-2years, there is female preponderance with male to female ratio of 1: 10.

Taneja et al[5] also found maximum number 38.7% cases between 1-5 year, 35.7% of cases were between 5-12 year. They also found male predominance in infancy, which correlate with our study. Sharma et al[6] in his study found 50.0% of cases in age group of 1 to 5 years followed by 27.5% of cases between 6 to 10 year. In the study by Krishnan et al[7]UTI was more common in children of 1-5 age groups (35.5%), which was in concordance with our study, they also found male predominance below 1 year.

In our study, Female (58%) predominance over males with female to male ratio1.38:1. Female are more likely than male to get UTI because urethra is shorter in female so bacteria can reach the bladder more easily. Due to longer course of urethra and the bacteriostatic action by prostatic secretions in them, the incidence of UTI is low in male.

Badhan et al[7]observed that majority of pathogens were isolated from female (54.2%) patients. Al-Mardeni et al[8] observed that out 529 culture positive culture 432 (81.7%) were female.

However unlike to our study, Kalantar et al[9] in his prospective study of 1696 children aged up to 5 years reported male to female ratio of 1.07:1.

In our studymaximum number of cases belonged to middle class (29.6%) followed by 26% belonged to upper middle class and 22.8% belonged to lower class according to modified B.G. Prasad scale.

In a study by Rao et al[10] most of the cases were from lower classes with 76.6% and 23.3% incidence in middle class, which is not in concordance with our study.

In our studyaccording to BMI, 203 cases had their BMI within normal range while 43(17.2%) and 4(1.6%) cases had their BMI less than -2SD and >2SD respectively. Our finding did not show any association between BMI and UTI. In favour of our finding, Hammar el al[11] did not found any association with BMI and increased risk of UTI.A study by Geerlings et al[12] did not describe any relationship between obesity and symptomatic UTI. The positive association between high BMI and UTI reported in some previous studies. Study by Semins et al[13] indicated that obesity was a risk factor for UTI.

A study by Ko et al[14] shows association between obesity and UTI only in the 0-5 months old group not in the 6-24 months old group. Bagga et al[15] in his study found significant bacteriuria in (15.2%) malnourished patients. According to Svanborg et al[16] lower secretory levels of IgA at the mucosal surface or a subclinical vitamin A deficiency present in malnourished children may have predisposed them to urinary tract infection.

In our studyfever was the most common presenting complaint in 148(59.2%) cases. Among abdominal symptoms, vomiting was present in 80(32.0%) cases, pain abdomen in 60(24.0%) cases, diarrhoea in 37(14.8%) cases and constipation in 3(1.2%) cases. In urinary symptoms, oliguria in 55(22.0%) cases, burning micturition in 28(11.2%) cases, yellow colour of urine and haematuria in 7(2.8%) cases each. Among respiratory symptoms, cough was present in 26(10.4%) cases and respiratory distress in 19(7.6%) cases. In CNS symptoms abnormal body movement in 12(4.8%) cases, altered sensorium and vertigo in 5(2.0%) cases each, non-specific symptoms were present in 47.2% cases.

In a study by Badhan et al[8], presenting symptoms were urinary symptoms alone in 29.2%, fever without urinary symptoms in 23.1%, fever with urinary symptoms 18.7%, painabdomen in 23.3%.

In studies conducted by other authors Sharma et al[6] (65.0%), Krishnan et al[7]shows fever was seen in majority of patients.

In the present study vomiting was present in 80 (32%) cases. Manohar et al[17] found vomiting in38.0% of Patients which is in line with our study. Rehman et al[18] found vomiting in 28% of cases, Krishnan et al[73] (27.8%), Sharma et al[6]found vomiting in 20.74 % cases. Above studies shows similar results to our study.

In our study pain abdomen was present in 60 (24%) cases. In a study by Rehman et al[18] abdominal pain was found in 22% of cases. Similar clinical presentation seen in Rao et al[10] (20.0%), Ramgopal et al[19] (17.8%).

Unlike to our study Sharma et al[20] pain abdomen was present in 57.1% cases, Singh et al[67] found similar complaint in 51.9% cases.

In present study oliguria was present in 55(22%) cases. In a study by Malla et al[21] oliguria was found in 7.1% cases and 12.5% cases in study by Vaidya et al[22].

In our study, simple UTI was found in 206(82.4%) cases, 26(10.4%) cases had complicated UTI while recurrent UTI was found in 18(7.2%) of cases. In age group 1 to 5 year recurrent and complicated UTI was more common.

In a study by Rehman et al[18]recurrent UTI was seen in 30.0% cases, which not correlate with our study.

Complicated UTI seen in 26 cases, out of which hydronephrosis in 4(15.4%), renal calculi in 6(23.1), PUV in 4(15.4%), CKD and cystitis in 3(11.5%) cases each while pyelonephritis in 5(19.3%) cases and left ectopic kidney in 1(3.8%) case was seen.

Conclusion

UTI is a common childhood illness. This study shows age and gender distribution in accordance to available literature. Females were more commonly affected than males. Fever being most common presenting symptom followed by vomiting and pain abdomen. Routine USG examination should be done in all cases of UTI to rule out associated renal anomalies.

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