



ORIGINAL RESEARCH PAPER

Paediatrics

PREVALENCE OF URINARY TRACT INFECTIONS IN FEBRILE CHILDREN (1-5 YEARS)

KEY WORDS: Urinary tract infection; Febrile children; Urine culture

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ABSTRACT

Background and objectives: Urinary tract infection, a common problem in the pediatric age group and a significant risk factor for long term consequences. Urinary complaints are nonspecific and vague and only after 5yrs of age, the typical triad of abdominal pain, vomitings, fever with chills & rigors, are seen.

The objective of this study is to know the prevalence of urinary tract infection in 100 febrile children.

Materials & Methods: A cross-sectional study of 100 febrile children aged 1-5years who attended pediatric department, KING GEORGE HOSPITAL, VISAKHAPATNAM are selected for a period of 19months and cases were selected randomly.

Results: Prevalence of UTI in febrile children in the age group of 1-5-year males is 1.8% and females is 6.8% with an overall prevalence of 4%. More than 40% of cases belong to grade V socioeconomic status. Next to fever (100%), dysuria (50%) and vomiting (25%) are the common symptoms.

E coli is the most common organism isolated from patients with UTI and 75% of microorganisms are sensitive to ceftriaxone. 25% of cases with UTI show Ultrasonographic features suggestive of acute pyelonephritis. VUR seen in 1 case.

Interpretation and conclusion: UTI should be considered as one of the potential causes of fever in children under 5 yrs of age. The febrile children with UTI usually present with nonspecific signs and symptoms, so urine culture should be considered as a part of diagnostic evaluation. The gold standard for diagnosis of UTI in Children is Urine culture.

INTRODUCTION

Urinary tract infection (UTI) one of the most common bacterial illness among febrile children, with a prevalence of 4-7%^{1,2}. Among febrile children admitted to hospital, UTI is the third most common cause of fever in children, after respiratory and gastrointestinal infection.

Urinary complaints are nonspecific and vague and only after 5yrs of age, the typical triad of abdominal pain, vomitings, fever with chills & rigors, suprapubic pain are common presentation of upper and lower UTI. The presence of fever has been considered as an important finding in young children with UTI, because it has been accepted as a clinical marker of renal parenchyma involvement (Pyelonephritis)³. In neonates, it is often a part of septicemia with non specific symptoms such as failure to thrive, vomiting, diarrhea being common and in older infants the usual symptoms are recurrent fever, diarrhea, vomiting, poor weight gain and abdominal pain. UTI has been associated with acute and chronic complications, and hence rapid evaluation and treatment of renal parenchymal damage is important as it can lead to renal scarring and hypertension in later life. Otherwise unexplained renal scarring has been one of the most common cause of end-stage renal disease (ESRD)⁴.

Microscopic examination of a fresh specimen of urine usually suggests UTI if it shows bacteria and neutrophil, but it should be confirmed by isolation of significant number of bacteria on urine culture Methods of Collection of Urine :

1. Mid Stream Clean Catch
2. By applying a collection bag to the perineum
3. Catheterization
4. Suprapubic Aspiration (SPA)

UTI is diagnosed based on positive urine culture of properly collected urine specimen of urine, a sample must be obtained for culture prior to therapy with antibiotics. As 7 various studies show that routine culture in febrile children with clinical evidence of other illness give high positive yields and hence a high index of suspicion should be maintained by practicing pediatricians during the first five years and urine culture ordered only whenever required 50% of the long term

sequelae of UTI in infants and young children appears to be preventable by urine testing.

MANAGEMENT

The obvious goals of treatment of UTI is to provide symptomatic relief and to prevent further recurrences and new or progressive renal damage, consists of following steps.

1. General measures -Supportive measure like liberal fluid intake, perineal hygiene, periodic voiding, treatment of constipation and pin worms and double micturition are as important as drug therapy
2. Treatment of acute presenting illness
3. Prevention of further relapses or recurrences.
4. Further management depending on the radiological findings

Urgent treatment is particularly important in neonates and young infants, who should preferably be hospitalized to ensure supportive measures such as fluid therapy and control of pyrexia UNCOMPLICATED UTI - 7 – 10 days course of oral antibiotics are started initially and are changed depending on the sensitivity pattern after 48 hours.

persistent vomiting, dehydration and with poor compliance suggests complicated UTI and the treatment should be aggressive⁵. COMPLICATED UTI and infants less than 3 months of age immediate hospitalization and parenteral therapy for 7 to 14 days oral outpatient therapy to complete a full 10 to 14 day course can be substituted in patients more than 2 months of age when afebrile for 24 to 48 hours.

AIMS AND OBJECTIVES

- To determine the prevalence of UTI in febrile children aged 1 – 5 years who attended King George hospital.
- To assess the validity of routine microscopic urinalysis when compared to urine culture in the diagnosis of UTI.
- To assess the usefulness of routine urine culture in febrile children aged 1-5years.

METHODOLOGY

This is a cross-sectional study of 100 febrile children aged

between 1-5years who attended pediatric department, KING GEORGE HOSPITAL ,VISAKHAPATNAM for a period of 19months and cases were selected randomly.

Inclusion criteria:

- Children aged 1– 5 years
- Fever of $\geq 38.40\text{C}$
- Minor potential source of fever like gastroenteritis, otitis media, URTI or nonspecific rash.
- Children with fever of more than three days

Exclusion criteria :

- Children on antibiotics
- Children with immunosuppression
- Definite source of fever on examination Eg. : Pneumonia, varicella.
- Children with known congenital malformations

Detailed history and clinical examination is done in all the cases to find out the cause of fever and necessary investigations are carried out to find the cause of fever and all the data are recorded.

Freshly voided clean catch mid stream urine sample is collected and Urinalysis is done within half an hour and same specimen is immediately sent to the department of microbiology for urine culture.

RESULTS

Out of 100 patients, 4 cases were diagnosed to have UTI as judged by the presence of significant bacterial growth in urine culture.

SEXWISE DISTRIBUTION OF CASES

Sex	Total No.	Culture Positive Cases	
		Number	Percentage
Male	56	1	1.8
Females	44	3	6.08
Total	100	4	4

TEMPERATURE AT THE TIME OF PRESENTATION (n=100)

Temperature (°C)	Mean \pm SD (°C)	Total No. of cases (n)	Culture Positive cases (C)	Percentage (c/n x 100)
37.4 – 38.3	37.84 \pm 0.39	40	1	2.5
38.4 – 39.3	38.83 \pm 0.28	45	2	4.4
> 39.3	40.07 \pm 0.50	15	1	6.6

SYMPTOMS IN CULTURE POSITIVE CASE (n = 4)

S.No	Symptoms	Culture Positive Cases (C)	Percentage (%) (c / n x 100)
1	Fever	4	100%
2	Dysuria	2	50
3	Vomiting	1	25
4	Chills and Rigors	2	50
5	Loss of appetite	1	25
6	Increased frequency	1	25
7	Irritability	1	25
8	Decreased urine output	0	0
9	Passing high coloured urine	1	25
10	Burning Micturition	1	25
11	Puffiness of face	1	25
12	Loose stool	0	0
13	Abdominal distension	0	0
14	Abdominal pain	1	25
15	Refusal of seeds	0	0
16	Dribbling of urine	1	25
17	Cough and cold	0	0
18	Convulsion	0	0
19	Foul smelling urine	0	0

PHYSICAL FINDINGS IN CULTURE POSITIVE CASE (n = 4)

S.No	Symptoms	Culture Positive Cases (C)	Percentage (%) (c / n x 100)
1	Fever	4	100
2	Dysuria	1	25
3	Vomiting	1	25
4	Chills and Rigors	0	0
5	Loss of appetite	1	25
6	Increased frequency	1	25
7	Irritability	0	0
8	Decreased urine output	0	0
9	Passing high coloured urine	1	25
10	Burning Micturition	0	0
11	Puffiness of face	0	0
12	Loose stool	0	0
13	Abdominal distension	0	0
14	Abdominal pain	0	0

CAUSES OF FEVER DEPENDING ON PROVISIONAL DIAGNOSIS

Diagnosis	No. of Cases		Total No. Of cases (n)	Culture positive cases		Total (C)	Percentage (c/n x 100)
	Male	Female		Male	Female		
ALRI	14	10	24	0	0	0	0
AURI	11	8	19	0	0	0	0
Acute gastroenteritis	11	5	16	0	0	0	0
Fever for evaluation	5	4	9	0	0	0	0
Neuro infection	4	3	7	0	0	0	0
Enteric fever	3	4	7	0	1	1	14.2
Malaria	3	3	6	0	0	0	0
UTI	3	4	7	1	2	3	42.88
Viral hepatitis	2	3	5	0	0	0	0
Total	56	44	100	1	3	4	-

URINALYSIS – PROTEINURIA (n=100)

Grade	With UTI	Without UTI	Total
Nil	1	57	58
1 +	2	20	22
2 +	2	9	11
3 +	2	7	9
Total	7	93	100

MICROSCOPIC URINALYSIS – PYURIA (n =100)

No. of pus cells per HPE	With UTI	Without UTI	Total
0-5	1	72	73
6-10	3	17	20
11-20	2	3	5
> 20	1	1	2
Total	7	93	100

MICROSCOPIC URINALYSIS – BACTERIURIA (n =100)

Bacteriuria	With UTI	Without UTI	Total
Present	2	1	3
Absent	1	96	97
Total	3	97	100

SENSITIVITY, SPECIFICITY AND PREDICTIVE VALUES OF MICROSCOPIC URINALYSIS IN IDENTIFYING POSITIVE URINE CULTURE RESULTS

Component	Sensitivity (%)	Specificity (%)	PPV (%)	NPU (%)
> 5 WBC / HPF	85	88	25	99.8

> 10 WBC / HPF	55	98.5	57.9	98.1
> 20 WBC / HPF	25	99.6	71.4	97.0
Any bacteria	60	99	70.6	98.3
Combined pyuria and bacteriuria	60	99	70.6	98.3

ORGANISMS GROWN IN CULTURE POSITIVE CASES (n = 4)

Organisms	Total No. of cases (C)	Percentage
E.Coli	3	75
Klebsiella	1	25
Proteus	0	0
Total	4	100

DISCUSSION

Out of the 100 febrile children who attended pediatric department, 4 had UTI giving an overall prevalence of 4%. Among 193 febrile children younger than 2 years, Roberts et al found that the rate of confirmed UTI was 4.1%. Dharnidarka et al, Hoberman et al and Bonadio in their studies of febrile infants reported prevalence of 5.4%, 5.3% and 5.53% respectively and have recommended routine urine culture as a part of the diagnostic evaluation.

There is slight female preponderance in culture positive cases with male to female ratio of 1:2. Hellstrom et al (1991) found that 8.4% of girls and 1.75% of boys upto 7 years of age had culture proven UTI at sometime⁷. Similar observation was made by Dharnidarka et al.

Next to fever, dysuria and vomiting were the common symptoms. In the present study, there is no significant difference among the three groups of temperature. However, high yield (6.6%) is obtained in patients with temperature > 39.3°C. Hoberman et al and Gorelic et al⁸ observed significant prevalence of UTI in febrile children with temperature > 39°C.

In the present study, 1 (25%) cases had a provisional diagnosis other than UTI like gastroenteritis, respiratory infection, which suggests that children with UTI would have been missed if urine culture is not taken as a routine diagnostic method of evaluation. However, routine urine culture maybe of no benefit in all patients with fever. Of 43 patients with respiratory infection, only 3 (1.4%) cases had UTI, which is similar to studies by Bauchner et al and Dharnidarka of 1.27% and 1.25% respectively. Routine urine culture in such patient are not justified.

Six (85.7%) patients with UTI and 36 (38.7%) cases without UTI had proteinuria which is statistically significant. These findings correlate well with the study by Johan Matthai et al who found that 78% and 20% of cases had proteinuria in culture positive and culture negative groups respectively.

6 (85.7%) patients with UTI and 21 (22.51%) cases without UTI had pus cells > 5 per HPF which is statistically significant, suggesting that 21 (22.51%) children without UTI would have been considered as infected if only pyuria is only taken as a diagnostic method for UTI. Goldsmith et al recorded a sensitivity of 82% and specificity of 81% while Hoberman et al obtained figures of 54% and 96% respectively.

In diagnosing UTI, pyuria > 10 WBC/HPF is more specific with higher positive predictive value than the conventional > 5 WBC / HPF. Bacteriuria along with pyuria had a specificity of 98.3% in predicting the infection. The most common organism isolated from patients with UTI was E.coli followed by klebsiella. Bryan CS et al reported, Escherchia coli as the most common urinary pathogen accounting for 85% of community acquired UTI.

The recurrence of UTI is also common in childhood which is about 50% in children with symptomatic UTI and 80% or more in children with asymptomatic bacteriuria.

CONCLUSION

UTI should be considered as a potential cause of fever in children under five years of age. The febrile children with UTI usually present with nonspecific signs and symptoms, and so urine culture should be considered as a part of diagnostic evaluation. The positive predictive value of pyuria >5 WBC / HPF, as an isolated feature is poor in making the diagnosis instead pyuria >10 WBC/HPF is more specific with higher positive predictive. Urine microscopy for bacteriuria significantly improves the reliability of microscopic urinalysis for detection of UTI, particularly when one combined with examination of the urinary sediment, for pyuria, overall urine culture is the gold standard for diagnosis of UTI in children.

Parents should be educated about the importance of UTI and its long term complications so that they bring the children, voluntarily for regular follow up. Improving the nutrition and early routine urinalysis of all febrile children prevent the complications of UTI.

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