



STUDY OF URINARY TRACT INFECTION IN FEBRILE CHILDREN WITHOUT OBVIOUS FOCUS IN AGE GROUP OF 1 MONTH TO 12 YEARS

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ABSTRACT

Background: Knowledge of baseline risk of urinary tract infection can help clinicians make informed diagnostic and therapeutic decisions.

Materials and methods: cross sectional study was conducted in tertiary health care teaching institute on febrile children without obvious focus between 1 month to 12 years of age group during a period of 1 year. Urine analysis, urine Culture and sensitivity were done in them.

Results: Out of total 160 febrile patients 31(19.37%) children showed significant pyuria. 8 (5.0%) were urine culture positive, out of these, 5(62.5%) were showed E.coli growth on culture.

Conclusion: UTI is common in children presenting with febrile illness and should be suspected strongly. Urine culture is the gold standard for diagnosing UTI. Microscopic urine analysis is a strong tool and is helpful in diagnosing UTI.

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INTRODUCTION

Urinary tract infections are the common disease in infants and in the toddlers. In children, UTI frequency, causative pathogen and clinical symptoms vary according to age and sex. Moreover because of wide variety of nonspecific and systemic symptoms it is difficult to perform test for early diagnosis and the resultant inaccurate diagnosis lead to antibiotic abuse. Thus in many cases severe renal injury occurs even before the UTI diagnosed. For this reason, an early and accurate diagnosis through careful examination and test can help in preventing severe renal injuries through adequate treatment and careful follow up.⁽¹⁾

Paediatric urinary tract infections (UTI) account for 0.7% of physician office visits and 5–14% of emergency department visits by children annually.⁽²⁾ Due to non specific presentations in children and rampant practice of prescribing antibiotics to all febrile children in our area, diagnosis of UTI is likely to be missed in children and it is well known fact that every single episode of UTI in children especially < 5yrs of age should be evaluated further to know the etiological diagnosis and to prevent critical renal damage due to recurrent episode of UTI.⁽³⁾

Hence there should be high index of suspicion in febrile children without obvious focus in order to pick up children with UTI. It would be helpful to know the magnitude of

problem in our area to recommend practices to prevent UTI in children.

Table 1 Distribution of study subjects according to age & gender (n=160)

Age groups (Years)	SEX		TOTAL
	MALE (%)	FEMALE (%)	
<1	17(19.32%)	13(18.06%)	30(18.75%)
1 - 3	24(27.27%)	19(26.39%)	43(26.88%)
4 - 6	22(25.00%)	22(30.56%)	44(27.50%)
7 - 9	13(14.77%)	6(8.33%)	19(11.88%)
10 - 12	12(13.64%)	12(16.66%)	24(15.00%)
TOTAL	88 (100.00%)	72(100.00%)	160 (100.00%)

Table 2 Distribution of study subjects according to urine showing > 5 pus cells /HPF (n=31)

Age group (years)	SEX		TOTAL (n=31)
	MALE (%) >5 Pus Cells/HPF	FEMALE (%) >5 Pus Cells/HPF	
<1	4 (33.33%)	3(15.78%)	7(22.58%)
1 - 3	6(50.00%)	7(36.85%)	13 (41.94%)
4 - 6	2(16.67%)	9(47.37%)	11(35.48%)
7 - 9	00(0.0%)	00 (0.0%)	00(0.0%)
10 - 12	00(0.0%)	00(0.0%)	00(0.0%)
Total	12(100%)	19(100%)	31(100.00%)

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Table 3 Distribution of study subjects according to results of urine culture. (n= 160)

URINE CULTURE	SEX		TOTAL
	MALE (%)	FEMALE (%)	
E. Coli	2(2.27%)	3(4.16%)	5(3.12%)
Klebsiella Pneumoniae	0(00)	1(1.38%)	1(0.62%)
Enterococcus	0(00)	1(1.38%)	1(0.62%)
Pseudomonas Auriginosa	0(00)	1(1.38%)	1(0.62%)
No growth	86(97.72%)	66(91.66%)	152(95%)
Total	88(100%)	72(100%)	160(100%)

Table 4 Distribution of study subjects according to USG findings

Ultrasonography Findings	Number (%)
Bilateral Moderate Hydronephrosis With Cystitis	1 (0.63 %)
Right Sided Hydronephrosis With PUJ Obstruction	1(0.63 %)
Thickened Bladder Wall With Cystitis	3 (1.87 %)
Normal	3 (1.87 %)
Not Indicated	152 (95.0 %)
Total	160

Table 5 Distribution of study subjects according results of culture and urine analysis

TEST	Culture +ve	Culture -ve	TOTAL
Urine analysis Positive	7	24	31
Negative	1	128	129
TOTAL	8	152	160

Materials and Methods

The present cross sectional study was conducted in the department of Paediatrics, R.C.S.M Government medical college and hospital Kolhapur over a period of 12 months. Febrile children without obvious focus between 1 month to 12 years of age attending the outpatient department or admitted in R.C.S.M. Medical College and Hospital, Kolhapur over a period of 12 months were included in the study. Permission from the Institutional Ethical Committee was taken before the start of the study.

Sample size was calculated by taking 7.8% as a prevalence of Urinary Tract Infection in Childhood from a Meta-Analysis study⁽⁴⁾. Considering 95% confidence level and 5% allowable error with 10% population as non response/incomplete answers. The sample size came to be 126. Thus we included total 160 study subjects in present study.

Children with obvious focus of respiratory tract, central nerves system, gastrointestinal tract and skin and soft tissue and parents /gaurdians not willing to enroll child in the study were excluded from the study.

A predesigned and pretested proforma was used to collect information. Informed consent was obtained from parents or guardians for enrolment of their children in the study. Children were interviewed using structured questionnaire for urinary tract infection. Data related to age, sex, and socioeconomic status was noted.

A complete history related to the onset, duration of fever, associated symptoms Such As nausea, vomiting, diarrhoea, urinary disturbances and other system involvement was obtained. A thorough physical examination with relevant investigations was carried out in all patients. Routine blood counts, urine analysis, urine Culture and sensitivity were done

in them. In children below 2 years of age, urine sample was collected under aseptic precautions by transurethral bladder cauterisation or suprapubic aspiration. In children above 2 years of age, a clean catch midstream specimen was used to minimize contamination by periurethral flora. Contamination was minimized by washing the genitalia with soap and water. Child was allowed to pass urine; Midstream sample was collected in sterile bottle and was sent for urine analysis, culture and sensitivity.

The urine was examined under microscope for hematuria and leukocyturia. In the present study more than 5 pus cells/HPF in a centrifuged urine sample was taken as significant pyuria and culture and sensitivity was performed in that patient / case.

On culture of urine, a colony count of more than $>10^5$ / ml organisms of a single species was considered significant. Samples showing insignificant growth, mixed growth of two or more pathogens or growth of nonpathogens were not considered as culture positive.

USG was done in culture positive cases and the detailed data was entered in the proforma.

Analysis of data was done using computer assisted statistical software SPSS Version 20.0

Results

Out of 160 patients in study ,88(55%) were males and 72(45%) were females. 30 cases were < 1year (18.75%), 1-3 years were 43(26.88 %), 3-6 years were 44(27.50 %), 6-9 years were 19(11.88 %) and the remaining i.e. 9 – 12 years were 24 (15.0 %).Maximum cases were seen in age group of 3-6yrs, 44(27.50%). (Table No.1)

Out of total 160 febrile patients 31(19.37%) children showed significant pyuria in centrifuged urine sample of which 12(38.70%) were males and 19 (61.29%) were females. Male to female ratio showing significant pyuria was 0.6:1. (Table No.2)

Majority study subjects were in age group 1-3 years (41.94%). No study subjects were from above 7 years of age. (Table No.2)

Out of 160 patients 8 (5.0%) were urine culture positive, out of these 8 pateints, 5 (62.5%) were showing E.coli growth,1 (12.5%) was shown klebsiella pneumonia, 1(12.5%) was Enterococcus and pseudomonas aeruginosa was 1(12.5%). The most common organism was E.coli among culture positive patients. (Table No.3)

Out of 160 patients 8 (5.0%) were urine culture positive, in this 8 urine culture positive USG was done. 1.87 % were not having any abnormality in USG, 3 patients were having thickened bladder wall with cystitis. (Table No.4)

Sensitivity of Urine analysis for diagnosis of UTI was 87.50 % and Specificity was 84.21 %. Positive predictive value was 22.58 % while Negative predictive value was 99.22 % (Table No.5)

DISCUSSION

In present study overall percentage of UTI was 5% which is similar to study by Nethersole PY *et al*⁽⁵⁾ Conducted in 2001, showed prevalence 4.1% to 7.5%, Quigley R⁽⁶⁾ study were prevalence of 7% was noted, Ferrara P *et al*⁽⁷⁾ 2.1% to 8.7% which is almost similar to the present study. In contrast to the present study, one study, Schlager TA⁽⁸⁾ reported low prevalence of 1.7%, whereas Rabasa AI and Gofama MM⁽⁹⁾ reported high prevalence of 13.7%.

Female infants with fever had a relatively high prevalence rate of UTI, especially during the first year of life. Our results are consistent with data from large epidemiologic UTI studies.^(10,11) Out of 160 febrile children, 8(5%) were culture positive of which Male were 2 (25.0%) and females were 6(75.0%), in age group < 2 years male to female ratio was 1:1, in more than 2 years of age prevalence of UTI higher in females than in males. Out of 8 culture positive cases maximum cases of UTI found in infants (25%) and in age group 12years (25%). After 2 years UTI was more in females (12.5%) as compared to males. In present study most common organism grew on urine culture was E.Coli (62.5%) out of 8 urine culture positive cases, followed by other organisms like Klebsiella pneumoniae, enterococcus, pseudomonas aeruginosa accounting 12.5% each.

According to Pnkaj Hari *et al*⁽¹²⁾ about 90% of first symptomatic UTI and 70% of recurrent infections are due to E.coli. Waisman Y *et al*⁽¹³⁾ stated in their studies that of the 35 cultures, 27 were positive for E.coli (76%), 2 for Klebsiella (6%), 2 for Enterococcus (6%), 2 for Pseudomonas (6%), 1 for group B streptococcus (3%), and 1 for Staphylococcus coagulase negative (3%). According to Chon CH *et al*⁽¹⁴⁾ the most commonly isolated urinary pathogens are enteric, gramnegative bacteria especially E.coli.

In the present study, Sensitivity and Specificity of urine analysis was 87.50% and 84.21%. PPV and NPV was 22.58% and 99.22%. Percentage of false positive and false negative was 15.79% and 12.50% respectively. Accuracy rate was 84.37%.

In correlation to present study Shaw KN *et al*⁽¹⁵⁾ stated sensitivity and specificity of 57.87% and 53.79% respectively and in other study by Waisman Y *et al*⁽¹³⁾ reported sensitivity and specificity of 97.1% and 82.5% and PPV and NPV of 69.4% and 98.6% respectively, are almost similar to present study.

CONCLUSION

UTI is a common condition among infants and young children. Overall prevalence was 5 % in present study with more prevalence in females as compared to male. Clinicians should be aware of the possibility that febrile children without any obvious focus may have urinary tract infection and should consider obtaining a urine culture specimen as part of their diagnostic evaluation. Urine culture is the gold standard test in diagnosing UTI. Urine culture positivity was more in urine analysis showing >5 pus cells/HPF i.e significant pyuria

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