



Original Research Article

Study of the Prevalence and Clinical Profile of Urinary Tract Infection in Febrile Children Aged 3 - 6 Years Who Attended Pediatric Outpatient Department in a Tertiary Care Hospital

Ashok C¹, Kumar GV^{1*}, Viswanathakumar HM²

¹Assistant Professor, ²Professor & HOD
Department of Pediatrics, Sri Siddhartha Medical College, Tumkur, Karnataka, India

*Correspondence Email: kumargowripura@yahoo.co.in

Received: 10/01/2013

Revised: 20/02/2013

Accepted: 22/02/2013

ABSTRACT

Background: Urinary tract infection (UTI) is one of the most common bacterial infections seen in children. It is estimated that at least 1% of boys and 3% of girls develop urinary tract infection during first ten years of life. The diagnosis of UTI in young children is important as it may be the marker of urinary tract abnormalities. We conducted an exploratory study of the prevalence of UTI describing presenting symptoms and the proportion found to have a UTI when urine samples were systematically requested from all eligible children.

Methodology: Five hundred febrile children between 3 to 6 years of age who attended pediatric outpatient department formed the study group. Detailed history was taken and clinical examination was done in all the cases to find out the cause of fever with special emphasis given to symptoms of UTI. Necessary investigations were carried out to find the cause of fever and all the data were recorded in a specially designed proforma for this study.

Results: Prevalence of UTI in febrile preschool school in the age group of 3-6 years was 2.9% in males and 5.5% in females with overall estimated prevalence of 4%. There was slight female preponderance in culture positive cases with male to female ratio of 1:1.5. Out of the 20 patients with UTI, 6 (30%) cases had ill and toxic appearance on clinical examination. 25% of cases with UTI had no other signs other than fever. 19 (95%) patients with UTI and 58 (12%) cases without UTI had pus cells > 5 per HPF which was statistically significant. In culture positive cases, 12 (60%) patients had bacteria in their urine where as in culture negative cases only 5 (1.04%) patients had bacteriuria which was statistically significant.

Conclusion: UTI should be considered as a potential cause of fever in children below six years of age. Urine culture should be considered as a part of diagnostic evaluation. High yield was obtained whenever UTI was suspected or in patients with fever with no apparent source and in female children with gastroenteritis. Hence urine culture should be done routinely in such patients when UTI is suspected.

Key words: UTI, Febrile children, urine culture.

INTRODUCTION

Urinary tract infection (UTI) is one of the most common bacterial infections

seen in children. It is estimated that at least 1% of boys and 3% of girls develop urinary tract infection during first ten years of life.

[1] Urinary tract infection may lead to renal scarring, hypertension, and end-stage renal disease. 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] UTI is mainly due to the ascending infection from the urethra. The diagnosis of UTI in young children is important as it may be the marker of urinary tract abnormalities. Early diagnosis is important to preserve renal function of the growing kidney. [4] UTI is one of the most important risk factor in development of renal insufficiency or end stage renal disease. [5] UTI whether symptomatic or asymptomatic have greater significance in childhood than in adults as most renal scars occur after such infections within the first five years of life. [6]

Several studies have reported varying prevalence rates of UTI in children ranging from 3.3 in USA to 37.5% in Pakistan. [7, 8] A recent review found that prevalence of UTI in children ranged from 2% to 20%. [9] The diagnosis of UTI in children poses a big challenge to the clinicians and several reasons have been responsible for the difficulties in establishing the diagnosis of UTI in children include; non-specific clinical presentation and the difficulty in getting urine sample for laboratory investigations. [10, 11] It is not known how often UTI is the cause of illness in young children presenting in general practice-based primary care and which children should be targeted for urine sampling. We conducted an exploratory study of the prevalence of UTI describing presenting symptoms and the proportion found to have a UTI when urine samples were systematically requested from all eligible children. This study was done to establish the magnitude of UTI among febrile children.

MATERIALS AND METHODS

The present study was carried out in G. Kuppaswamy Naidu Memorial hospital, Coimbatore, Tamil Nadu over a period of one year from April 2011 to April 2012. Five hundred febrile children between 3 to 6 years of age who attended pediatric outpatient department formed the study group. Purposive sampling technique was used to select the cases for the purpose of study. Children aged 3-6 years with fever of $\geq 37.4^{\circ}\text{C}$ and children with minor potential source of fever such as gastro enteritis, otitis media, upper respiratory tract infection or fever with nonspecific rash were included in the study. Children on antibiotics, children with immunosuppression, children with definite source of fever on examination like Pneumonia, varicella etc. were excluded from the study. Detailed history was taken and clinical examination was done in all the cases to find out the cause of fever with special emphasis given to symptoms of UTI. Necessary investigations were carried out to find the cause of fever and all the data were recorded in a specially designed proforma for this study.

RESULTS

A total of 500 febrile preschool children between 3 to 6 years of age who attended pediatric outpatient department were studied. Out of these patients, 280 were males and 220 were female children. 20 cases were diagnosed to have UTI with 12 female and 8 male as judged by the presence of significant bacterial growth in urine culture. Prevalence of UTI in febrile preschool school in the age group of 3-6 years was 2.9% in males and 5.5% in females with overall estimated prevalence of 4%. There was slight female preponderance in culture positive cases with male to female ratio of 1:1.5.

About 75 (15%) cases had temperature $> 39.3^{\circ}\text{C}$ of which 6 patients

had UTI. Fever was the main clinical feature in the diagnosed UTI. Other symptoms are shown in table-1. Out of the 20 patients with UTI, 6 (30%) cases had ill and toxic appearance on clinical examination. 25% of cases with UTI had no other signs other than fever shown in table-2. Two patients with UTI had phimosis. Fourteen (70%) patients with UTI and 140 (29.1%) cases without UTI had proteinuria which was statistically significant. 19 (95%) patients with UTI and 58 (12%) cases without UTI had pus cells > 5 per HPF which was statistically

significant. This suggests that 58 (12%) children without UTI would have been considered as infected if only pyuria was taken as a diagnostic method for UTI. In culture positive cases, 12 (60%) patients had bacteria in their urine where as in culture negative cases only 5 (1.04%) patients had bacteriuria which was statistically significant. However, 8 (40%) cases with UTI would have been missed if only presence of bacteria on microscopy was taken as a method of diagnosis for UTI.

Table 1. Symptoms in culture positive cases (n = 20)

Sl. No.	Symptoms	Culture positive cases	Percentage
1	Fever	20	100
2	Dysuria	9	45
3	Vomiting	7	35
4	Chills and rigors	6	30
5	Loss of appetite	6	30
6	Increased frequency	5	25
7	Irritability	5	25
8	Decreased urine output	4	20
9	Passing high coloured urine	4	20
10	Burning Micturition	4	20
11	Puffiness of face	4	20
12	Loose stool	4	20
13	Abdominal distension	4	20
14	Abdominal pain	4	20
15	Refusal of feeds	3	15
16	Dribbling of urine	3	15
17	Cough and cold	3	15
18	Convulsion	2	10
19	Foul smelling urine	1	5

Table 2. Physical findings in culture positive cases (n = 20)

Sl. No.	Signs	Culture positive cases	Percentage
1	Temperature $\geq 37.4^{\circ}\text{C}$	20	100
2	Ill and toxic appearance	6	30
3	Dehydration	4	20
4	Puffiness of face	4	20
5	No other signs	5	25
6	Pedal edema	2	10
7	Bladder distension	2	10
8	Renal angle tenderness	2	10
9	Supra pubic tenderness	2	10
10	Ascites	2	10
11	Phimosis	2	10
12	Hypertension	1	5
13	Signs of acute upper respiratory tract infection	2	10
14	Signs of lower respiratory tract infection	1	5

DISCUSSION

Out of the 500 febrile children who attended pediatric OPD, 20 patients had UTI giving an overall prevalence of 4%. This prevalence is comparable to many studies conducted all over the world. Jeena PM, et al, [3] Shaw KN, et al, [7] Okwara FN et al, [12] showed the prevalence ranged from 3.3%- 7.5%. In our study, UTI was more common in female children. Male: female ratio was 1:1.5. Other such studies also showed male: female ratio of 1:1.9 [13,14] and 1:2. [15] This can be easily attributed to short urethra in female.

There was no consistent symptom common to all patients with UTI other than fever. However, dysuria and vomiting were the predominant symptoms. Other nonspecific symptoms like loss of appetite (30%), irritability (25%) and refusal of feeds (15%) were also noted. Features like loose stool (14.3%), febrile seizures (13.0%), haematuria (10.7%), hepatosplenomegaly (7.1%) were also seen in a study done by Malla KK et al. [15] One or the other symptoms referable to the urinary tract were present only in 45% of patients with UTI, indicating the absence of symptoms in the remainder. Out of 40 patients with febrile convulsion, 2 (5%) cases had UTI.

Hypertension was noted in 1 (5%) case with UTI which is similar to the observation made by Jaya et al. [16] Fever appears to be consistently present in young children with UTI, no other signs or symptoms accurately predict the presence of UTI. In fact, 25% of children had no other signs other than fever indicating the importance of recognition of UTI in such patients. In the present study, 14 (70%) cases had a provisional diagnosis other than UTI such as gastroenteritis, respiratory infection. This suggests that children with UTI would have been missed if urine culture was not taken as a routine diagnostic method of evaluation. However, routine urine

culture may not be beneficial in all patients with fever. Of 80 cases with gastroenteritis, 4 (5%) patients had UTI. Female patients with gastroenteritis are particularly at increased risk of UTI (10.7%), which is statistically significant ($P < 0.05$). Heavy periurethral colonization often associated with perineal contamination following gastroenteritis will explain the high degree of prevalence in these patients.

CONCLUSION

UTI should be considered as a potential cause of fever in children below six years of age. As the febrile children with UTI usually present with nonspecific signs and symptoms urine culture should be considered as a part of diagnostic evaluation. High yield was obtained whenever UTI was suspected or in patients with fever with no apparent source and in female children with gastroenteritis. Hence urine culture should be done routinely in such patients when UTI is suspected.

REFERENCES

1. Watson AR, Taylor CM, McGraw M. Disorders of the urinary system. Forfar and Arneil's Textbook of Pediatrics, 6th eds. Neil McIntosh, Peter Helms, Rosalind Smyth. Churchill Livingstone, Spain 2003: 613-20.
2. Hoberman A, Charron M, Hickey RW, Baskin M, Kearney DH, Wald ER. Imaging studies after a first febrile urinary tract infection in young children. *N Engl J Med* 2003;348:195.
3. Jeena PM, Coovadia HM, Adhikari M. Probable association between urinary tract infections UTI and common diseases of infancy and childhood: a hospital-based study of UTI in Durban, South Africa. *J Trop Pediatr* 1996;42(2):112-4.
4. Schlager TA. Urinary tract infections in children younger than 5 years of age: epidemiology, diagnosis, treatment,

- outcome and prevention. *Paediatr Drugs* 2001; 3: 219-27.
5. Elder JS. Urinary disorders in infants and children. Nelson Textbook of Pediatrics, 17th eds. Behrman RE, Kleigman RM, Jenson HB. Saunders, New Delhi 2004: 1785-9
 6. Downs SM Technical report: urinary tract infections in febrile infants and young children. The Urinary Tract Subcommittee of the American Academy of Pediatrics Committee on Quality Improvement. *Pediatr* 1999. 103(4):e54
 7. Shaw KN, Gorelick M, McGowan KL, Yakscoe NM, Schwartz JS Prevalence of urinary tract infection in febrile young children in the emergency department. *Pediatr* 1998. 102(2):e16
 8. Anis ur R, Jahanzeb M, Siddiqui TS, Idris M Frequency and clinical presentation of UTI among children of Hazara Division, Pakistan. *J Pak Med Assoc* 2008. 20(1):63-5.
 9. Shaikh N, Morone NE, Bost JE, Farrell MH. Prevalence of urinary tract infection in childhood: A meta-analysis. *Pediatr Infect Dis J* 2008;27:302 – 8.
 10. Musa-Aisien AS, Ibadin OM, Ukoh G, Akpede GO Prevalence and antimicrobial sensitivity pattern in urinary tract infection in febrile under-5s at a children's emergency unit in Nigeria. *Ann Trop Pediatr* 2003. 23(1):39-45
 11. Brown BJ, Asinobi AO, Fatunde OJ, Osinusi K, Fasina NA Antimicrobial sensitivity pattern of organisms causing urinary tract infection in children with sickle cell anaemia in Ibadan, Nigeria. *West Afr J Med* 2003. 22(2):110-3.
 12. Okwara FN, Obimbo EM, Wafula EM and Murila FV Bacteraemia, Urinary Tract Infection and Malaria in Hospitalized Febrile Children in Nairobi: Is there an Association? *East Afr Med J* 2004. 81: 47-51.
 13. Akram M, Shahid M, Khan AU. Etiology and antibiotic resistance patterns of community-acquired urinary tract infections in JNMC Hospital Aligarh, India. *Ann Clin Microbiol Antimicrob* 2007; 6: 4.
 14. Bouskraoui M, Ait Sab I, Draiss G, Bourrous M, Sbihi M. Epidemiology of urinary tract infection in children in Marrakech. *Arch Pediatr* 2010; 17: 5177-8.
 15. Malla KK, Sarma MS, Malla T, Thapalial A. Clinical profile, bacterial isolates and antibiotic susceptibility pattern in urinary tract infection in children-hospital based study. *J Nepal Paeditr Soc* 2008; 28: 52-61.
 16. Jaya G. Evaluation of urinary tract infections. *Indian Paediatr* 1996; 33: 635-640.

How to cite this article: Ashok C, Kumar GV, Viswanathakumar HM. Study of the prevalence and clinical profile of urinary tract infection in febrile children aged 3 - 6 years who attended pediatric outpatient department in a tertiary care hospital. *Int J Health Sci Res.* 2013;3(2):1-5.
