

Research Article

Study of clinical profile and risk factors associated with febrile urinary tract infection in preschool children

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ABSTRACT

Background: Urinary tract infection (UTI) is a term applied to a variety of clinical conditions ranging from asymptomatic presence of bacteria in the urine to severe infection of the kidney with resultant sepsis. According to The National Institute for Health and Clinical Excellence (NICE) guidelines, urinary tract infection is defined by a combination of clinical features and the presence of bacteria in urine. The risk factors of UTI are age, gender, constipation, lack of circumcision, not taking anthelmintic and lack of toilet training.

Methods: This was across sectional study conducted on febrile preschool children, aged 3 to 6 years, who attended the outpatient department of Sri Siddhartha Medical College, Tumkur. Children with symptoms suggestive of UTI were enrolled, and a written informed consent was obtained from the parents. They were then interviewed using structured questionnaire for UTI.

Results: Out of 194 febrile preschool children, 21 cases were diagnosed to have UTI. Of the 194 cases, 102 (52.6%) were females and 92 (47.42%) were male. Out of 21 urine culture positive cases 14 (66.6%) were females and 7 (33.33%) were males. Occurrence of UTI was 7.6% in febrile males, 13.72% in febrile females and had the estimated overall occurrence is 10.8%. Fever was present in all the cases. Besides fever, 47.62% children had increased frequency, 42.86% had excessive crying while micturition and 38.10% had chills and rigors. Foul smelling urine was present in 33.33% of children while 23.81% had abdominal pain. Out of 92 male children studied 16 (17.39%) males had phimosis, of which 2 (12.5%) developed urinary tract infections. Constipation was seen in 3 (14.29%) children with UTI. Worm infestation was seen in 5 (23.81%) children with UTI.

Conclusions: Children with urinary tract infections usually present with nonspecific symptoms and signs and hence a urine analysis and culture should always be part of an initial diagnostic evaluation of urinary tract infections. Female sex, constipation, not taking anthelmintic, lack of toilet training and phimosis are significant risk factors for febrile urinary tract infection in children.

Keywords: Urinary tract infection, Preschool children, Risk factors

INTRODUCTION

A urinary tract infection is defined as the presence of organisms in the urinary tract, which is usually sterile. Urinary tract infection (UTI) is a term applied to a variety of clinical conditions ranging from asymptomatic presence of bacteria in the urine to severe infection of the kidney with resultant sepsis.¹ According to The National

Institute for Health and Clinical Excellence (NICE) guidelines, urinary tract infection is defined by a combination of clinical features and the presence of bacteria in urine.² Over recent decades, the importance of UTI has been increasingly recognized, in particular the role of UTI as an occult cause of febrile illness in young children. Although UTIs do not occur with as great a frequency in children as in adults, they can be a source of

significant morbidity in children. For reasons that are not yet completely understood, a minority of UTIs in children progress to renal scarring, hypertension and renal insufficiency.³ It is the third most common bacterial infection in children in developing countries after those of the gastrointestinal and respiratory tract. Because of nonspecific signs and vague symptoms in very young children, they remain unrecognized and therefore precise data on incidence and prevalence of UTI are not available. The commonest age for the occurrence of the first symptomatic UTI is the first year of life and males are affected more than females.⁴ During infancy, the risk of developing UTI is equal in boys and girls and thereafter higher in girls.⁵

Clinical presentation of UTI in children may be nonspecific and the appropriateness of certain diagnostic tests remains controversial. Studies have shown that UTI may often be missed on history and physical examination, and the decision to screen for UTI must balance the risk for missed infections with the cost and inconvenience of testing.⁶

The risk factors of UTI are numerous; they may be age, gender, constipation, lack of circumcision, inadequate water intake, not taking anthelmintic and lack of toilet training. As males are more likely to be born with structural abnormalities of the urinary tract, UTI is more common in their first six months of life.⁷ In preschool years symptomatic infections occur 10 to 20 times more frequently in girls than in boys.⁸ Constipation is a common problem of children worldwide. Estimates of the prevalence rate of functional constipation in the pediatric population have varied from 4% to 37%. Urinary tract infection is a great morbidity in children.^{9,10} It encompasses renal damage as well as mortality of children. Many risk factors are responsible for initial urinary tract infection and recurrent urinary tract infection. The goal of our study is to know the clinical profile and risk factors which are associated with urinary tract infection in children.

METHODS

This was across sectional study conducted on febrile preschool children, aged 3 years to 6 years, who attended the outpatient department and inpatient department of Sri Siddhartha Medical College, Tumkur, Karnataka, India. Febrile children who attended outpatient department were submitted to preliminary screening interview to suspect urinary tract infection. Children with symptoms suggestive of urinary tract infections were enrolled, and a written informed consent was obtained from the parents. They were then interviewed using structured questionnaire for urinary tract infection. Urine samples of all symptomatic children were sent for urine routine

microscopy and for urine culture. Data was statistically analyzed.

RESULTS

A total number of 194 febrile preschool children between 3 to 6 years of age who attended pediatric department were studied. Out of these patients, 21 cases were diagnosed to have UTI. Of the 194 cases of this study, 102 (52.6%) were females and 92 (47.42%) were male. Out of 21 urine culture positive cases 14 (66.6%) were females and 7 (33.33%) were males. Occurrence of UTI was 7.6% in febrile males, 13.72% in febrile females and had the estimated overall occurrence is 10.8% (Table-1).

Table 1: Occurrence of UTI in febrile children.

Sex	Total number	Number of urine culture positive	Percentage (%)
Male	92	7	7.6
Female	102	14	13.72
Total	194	21	10.80

Fever was present in all the cases. Besides fever, 47.62% children had increased frequency, 42.86% had excessive crying while micturition and 38.10% had chills and rigors. Foul smelling urine was present in 33.33% of children while 23.81% had abdominal pain (Table 2).

Table 2: Symptomatology in Culture Positive Cases (n=21).

Symptoms	Urine culture positive cases (n=21)	Percentage (%)
Vomiting	4	19.05
Chills and rigors	8	38.10
Increased frequency	10	47.62
Passing high colored urine	2	9.52

Table 3: Risk factors associated with UTI in children.

Risk factors	Number	Percentage (%)
Constipation	3	14.29
Poor toilet habits	4	19.05
Pin worm infestation	5	23.81
Female	14	66.66

Out of 92 male children studied 16 (17.39%) males had phimosis, of which 2 (12.5%) developed urinary tract infections. Constipation was seen in 3 (14.29%) children with UTI. Worm infestation was seen in 5 (23.81%) children with UTI (Table 3).

Table 4: Various studies showing prevalence of urinary tract infection in febrile children.

Sr. No.	Author (year)	Age of population	No. of children studied	Prevalence
1.	Roberts et al ¹¹	0-2 years	193	4.1
2.	Bonadio ¹²	0-1 year	265	5.53
3.	Hoberman ¹³ et al	0-1 year	945	5.3
4.	Lin et al ¹⁴	0-1 year	129	13.6
5.	Krober et al ¹⁵	0-12 years	182	11
6.	Schwartz et al ¹⁶	0-3 Months	463	18.3
7.	Stanley et al ¹⁷	0-1 years	92	27
8.	Ashok C et al ¹⁸	3-6 years	500	4

DISCUSSION

Urinary tract infection is a common, potentially serious and often occult bacterial infection of childhood. Urinary tract infection causes acute morbidity as well as long term sequelae including hypertension and impaired renal function. In most studies incidence of UTI is more in females than males. In the present study 10.8% of the children had urinary tract infections, with 13.72% of the females and 7.6% of the males studied having urine culture positive. The prevalence of UTI from various studies varies from 3% to 27%. The present study also falls in the range with 10.80% of the children studied having urinary tract infection (Table 4).

Females are more prone to urinary tract infections than males. Hellstrom et al found that 8.4% of girls and 1.75% of boys aged up to 7 years had UTI.¹⁹ Hoberman et al¹³ and Roberts et al¹¹ reported statistically significant increase in UTI in febrile female children. In the present study 13.72% of the females studied had culture positive UTI while 7.6% of the males had UTI.

The present study considered only febrile children. Increased frequency of micturition was seen in 47.62% of the cases and is the most common symptom, besides fever. Pain or excessive crying while micturition was seen in 42.86% of children. Foul smelling urine in 33.33% of children. Abdominal pain was present in 23.81% and vomiting in 19.05%. Smellie et al²⁰ found 28% of children to have abdominal or loin pain. Hoberman et al¹³ showed vomiting in 40% and diarrhea in 30% of the children. Craig et al²¹ showed vomiting in 42%, diarrhea in 21%, Dysuria in 15%, Foul smelling urine in 13%, abdominal pain in 13% and increased frequency in 10%. In the present study the risk factors were female children (66.66%), constipation (14.29%), worm infestation (23.81%) and poor toilet habits (19.05%). Phimosis was seen in 28.57% of the male children who had UTI. Pradeep Sivaraj et al study showed 12.7% of the children had constipation, 73.4% of the children had improper toilet training and phimosis was seen in 25.3% of the children who had UTI.²²

CONCLUSION

Urinary tract infection should always be kept in mind while evaluating a child with fever, especially in the younger age groups. Children with urinary tract infections usually present with nonspecific symptoms and signs and hence a urine analysis and culture should always be part of an initial diagnostic evaluation of urinary tract infections. Female sex, constipation, not taking anthelmintic, lack of toilet training and phimosis are significant risk factors for febrile urinary tract infection in children.

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