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ORIGINAL ARTICLE

Frequency of Urinary Tract Infection in Febrile Children without Any Focus on Infection

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ABSTRACT

Background: In newborns and young children, a urinary tract infection is a frequent hidden cause of fever. Children younger than a year old who appear with fever and symptoms of UTI are usually given treatment for something else.

Objectives: The objective of this study was to assess the prevalence of UTI in children presenting to a tertiary care hospital between the ages of 1 month and 36 months with nonspecific fever.

Duration and study settings: The Children's Hospital Pakistan Institute of Medical Science, SZABMU, Islamabad, was the site of this trial, which ran from Jan 2018 to June 2018.

Study design: Descriptive cross sectional

Methodology: After a complete medical history and physical examination, a urine sample was taken for testing and culture using a soft tube in younger children and a clean catch approach in older children or those who are cooperative. Urisys 2400 was used to analyse the urine samples. Larger children's urine samples were grown on CLED agar plates (cysteine lactose, electrolyte deficient). Clinitek Siemens, a haematology analyser, was used to determine the number of white blood cells in the blood. The Pakistan Institute of Medical Sciences in Islamabad is home to a state-of-the-art laboratory where tests including leucocyte count, urine DR, and culture were conducted. A pre-designed proforma was used to record the patient's demographic information, medical history, diagnosis, and laboratory results.

Results: In this study, 6.47 percent (n=18) of 278 children aged 1 to 36 who presented to a tertiary care hospital with a fever and no other obvious signs of infection were found to have a urinary tract infection.

Conclusion: Children arriving to a tertiary care hospital with a fever and no other signs of infection are not likely to have a urinary tract infection.

Keywords: UTI in children with diffuse fever and no obvious source of infection.

INTRODUCTION

When it comes to kids and their visits to urgent care centres and paediatricians, fever is a common presenting problem. An individual's history and a thorough physical examination can usually pinpoint the origin of a high temperature [1]. However, there are situations when, despite a detailed history and a comprehensive physical examination, the cause of a fever cannot be determined. Fever with no clear cause is what we name this condition (FWS). Evaluating a youngster with a fever involves a delicate balancing act between ensuring the child's safety and avoiding unnecessary tests and treatment [2]. Urinary tract infections are a common hidden cause of fever in newborns and young children. Children younger than a year old who appear with fever and symptoms of UTI are usually given treatment for something else. UTIs are difficult to diagnose and treat in children since the symptoms tend to be all over the place and nonspecific. In addition, kids lack the capacity to express themselves clearly and to pinpoint the source of their illnesses as adults [3]. Febrile UTIs are a common symptom in children with structural renal abnormalities and vesico-ureteral reflux (VUR). Similarly, UTIs can be brought on by obstructive anomalies [4]. Long-term consequences include kidney scarring, hypertension, and chronic renal insufficiency, whereas short-term complications include severe pyelonephritis or sepsis [5]. Multiple studies have found that 7 percent of newborns with fever had a urinary tract infection. The highest rates of UTIs are seen in female newborns younger than 12 months of age and male infants younger than 3 months of age who have not undergone circumcision [6]. Examination of the urine is the most important part in determining whether or not a young child has a fever [7]. Since UTIs are a prevalent source of life-threatening bacterial infections, early detection is crucial for preventing renal consequences like persistent pyelonephritis, renal scarring, and renal failure. A UTI is easily misdiagnosed, leading to the unnecessary use of antibiotics, which can be avoided with careful urine examination. Similarly, imaging should only be done if it would change management, as voiding cystourethrography (VCUG) has multiple downsides, including cost, radiation exposure, chance of producing UTI, and discomfort for the child [8].

The goal of this research is to determine the prevalence of UTIs as an undifferentiated cause of fever in children aged 1 to 36 months. It's possible that this will aid in both the detection and treatment of urinary tract infections, as well as the avoidance of consequences that can arise from going untreated. In order to ensure prompt diagnosis, treatment, and prevention of future complications associated with UTI, the data may be useful in defining a departmental protocol for doing urine analysis in all children presenting with fever without any focus of infection [9].

Sample size: In total, 278 patients were used for the research. Software designed for determining sample sizes in studies of prevalence uses the following parameters: 95% confidence interval, 3% precision level, and 7% frequency of UTI in newborns and early children to arrive at a sample size.

Formula: $n=Z^2P(1-P)/D^2$

N=Sample Size
Z=1.96(standard value for normal distribution)
P=0.07(7% frequency of UTI, Prevalence rate)
d=0.03(3% precision)

Inclusion criteria:

- ❖ Individuals of either sex
- ❖ Individuals aged 1–36 months
- ❖ Cases of patients with a nonspecific<1 week-long fever

Exclusion criteria:

- ✓ Any child displaying signs and symptoms with a localised origin, such as a rash in one area and respiratory, craniofacial, neurological, gastrointestinal, musculoskeletal, or urogenital issues in another.
- ✓ Children who have just received an antibiotic, as the drug may inhibit the body's natural response to the illness.
- ✓ Children who have bladder catheterized during the next 48 hours. Iatrogenic urinary tract infections may result from doing this.
- ✓ Children who have already undergone urinary tract surgery, as this may skew the results of the U D/R test.
- ✓ It's possible that this increases the risk of UTI in kids who already have urogenital anomalies.
- ✓ Individuals with preexisting conditions that compromise immunity, such as cancer, asplenia, or HIV infection.

Statical Analysis: Statistic software for the social sciences was used to enter and evaluate the data (V-17). Quantitative variables

like age were analysed using mean and standard deviation, while qualitative variables like gender, socioeconomic position, domicile, and UTI were analysed using frequencies and percentages. Using stratification, data on potential effect moderators including age and gender were gathered. For each outcome variable, we used a chi-square test after stratification to determine whether or not there was a statistically significant effect.

RESULTS

To investigate the prevalence of UTI in children aged 1 to 36 years old who presented with fever at a tertiary care hospital but no other obvious source of infection, 278 patients meeting the inclusion/exclusion criteria were included.

Table 1: Out of 278 cases, 32.01%(n=89) cases were between 1-18 months of age whereas 67.99%(n=189) were between 19-36 months of age, mean + SD was calculated as 23.16+7.32 months

Age (in months)	No. of patients	%
1-18	89	32.01
19-36	189	67.99
Total	278	100
Mean +SD	23.16+7.32	

Table 2: Gender distribution shows that 39.21%(n=109) were male and 60.79%(n=169) were females

Gender	No. of patients	%
Male	109	39.21
Female	169	60.79
Total	278	100

Table 3: Frequency of UTI in children between 1 month to 36 months of age presenting with fever without any focus of infection in a tertiary care hospital was recorded in 6.47%(n=18) whereas 93.53%(n=260) had no findings of this morbidity

UTI	No. of patients	%
Yes	18	6.47
No	260	93.53
Total	278	100

Table 4: Frequency of organisms in cases with UTI reveals that out of 18 cases 55.55(n=10) had E.Coli followed by 27.78%(n=5) with Klebsiella Pneumonia and 16.67%(n=3) had others

Organism	No. of patients	%
E.coli	10	55.55
Klebsiella pneumonia	5	27.78
Others	3	16.67
Total	18	100

Table 5: Frequency of socioeconomic status of the participants shows that 50%(n=139) had low socioeconomic status, 29.86%(n=83) had middle and 20.14%(n=56) had high socioeconomic status

SES	No. of patients	%
Low	139	50
Middle	83	29.86
High	56	20.14
Total	278	100

Table 6: 56.47%(n=157) were urban and 43.53%(n=121) were rural residents

Residence	No. of patients	%
Urban	157	56.47
Rural	121	43.53
Total	278	100

Table 7: Age related stratification of the prevalence of urinary tract infections in patient children presenting to a tertiary care hospital with fever and no clear cause

Age (in months)	UTI		P value
	Yes	No	
1-18	7	82	0.51
19-38	11	178	

Table 8: Age, sex, income, geography, and urinary tract infection status were used to divide the data. Using stratification, data on potential effect moderators including age and gender were gathered. The influence of these on the outcome variable was determined using a post-stratification chi-square test, with significance set at a p value of 0.05. You may see the results in Table 8 below.

Gender	UTI		P value
	Yes	No	
Male	6	103	0.59
Female	12	157	

Table 9: Age related stratification of the prevalence of urinary tract infections in patient children presenting to a tertiary care hospital with fever and no clear cause between 1 and 36 months of gender

Residence	UTI		P value
	Yes	No	
Urban	11	146	0.68
Rural	7	114	

Table 10: Stratification For Frequency of Uti in Children Between 1 Month To 36 Months of Age Presenting with Fever without Any Focus of Infection in A Tertiary Care Hospital With Regards To Socioeconomic Status

SES		UTI		P value
		Yes	No	
Low(n=139)	Yes	10	129	0.62
	No	8	131	
Middle(n=83)	Yes	6	77	0.73
	No	12	183	
High(n=56)	Yes	2	54	0.32
	No	16	206	

DISCUSSION

The goal of this research was to ascertain the prevalence of UTIs as a cause of nonspecific fever in infants and toddlers between the ages of 1 and 36 months. Hopefully, this will help in the diagnosis and treatment of urinary tract infections, as well as the prevention of complications that can result from ignoring them. There were 278 patients in total, with 32.01% (n=89) falling between the ages of 1 and 18 months and 67.01% (n=189) falling between the ages of 19 and 36 months; the mean + SD age was calculated to be 23.16+7.32 months; 39.21% (n=109) being male and 60.79% (n=169) being female; and 6.47% (n=18) of children presenting with fever without a clear source of infection at a paediatric

Multiple studies have found that 7 percent of newborns with fever had a urinary tract infection. Female newborns less than 12 months and male infants younger than 3 months who have not been circumcised had the highest prevalence of UTI89. Similar results were found in our investigation, suggesting that UTIs occur at a similar frequency to that reported in the aforementioned study.

Children younger than 2 years old with no obvious cause of fever based on history and physical examination have a 5–90% chance of having a urinary tract infection, according to another study [10-12]. The incidence of urinary tract infections was found to be greater in girls than in males in the same study, whereas the incidence of circumcision was found to be lower in males.

Urinary tract infections (UTIs) were found to be more common among females (6.5%) than among boys (3.3%) in the study population of infants younger than 1 year old. 1 in 8 1- to 2-year-old girls were affected, compared to 1 in 99 1- to 2-year-old boys. Our findings corroborate these findings, showing that UTIs are more common in females than males between the ages of 1 and 18 months and 19 and 38 months, with the bulk of male cases occurring between the ages of 1 and 18 months.

UTIs affect 1% of all children in their first year, however after age one, the rate drops significantly for boys. Circumcision has been linked to a lower risk of UTI, which may explain why estimates of UTI incidence among infant males have varied between populations [13].

To assess the prevalence of UTIs in circumcised and uncircumcised boys, researchers from McGill University in Montreal analysed data from 393 boys who sought treatment in the emergency room of the Montreal Children's Hospital with

symptoms of UTI. Only 84 of these boys were circumcised, whereas 309 were not. Researchers believe that bacteria that has built up behind the foreskin can enter the urinary tracts of uncircumcised males, increasing their risk of illness [14-17].

Researchers found that pre-school girls were more likely to get UTI than boys did. Constipation is known to increase the risk of urinary tract infections (UTIs) in women, especially those with shorter urethras [18]. Constipation alone, in the presence of a dilated rectum, has been demonstrated to trigger the same pattern of voiding dysfunction seen in children with persistent unstable bladders. When constipation is effectively treated, bladder function returns to normal, and the patient no longer experiences UTI [19].

Male periurethral flora composition has been linked to UTIs, however female periurethral flora composition has not been found to be a significant factor in the aetiology of UTIs. After the first few months of life, girls, likely due to the shorter length of the female urethra, experience a higher incidence of UTIs compared to males.

In a study with 7,500 kids under the age of five, researchers found that the rate of UTIs in urban regions was equivalent to that in rural ones. Our own research found no statistically significant difference in the proportion of afflicted children between urban and rural areas, so these results are in line with what we discovered.

According to a study child with low socioeconomic status are more prone to develop UTI, it also agrees with our hypothesis. This association is of severe acute malnutrition in low socioeconomic status. Under the Influence of Drugs (UTI) is more likely in malnourished children than in their well-nourished peers [20]. In impoverished nations, incidence of urinary tract infections (UTIs) can be as low as 6% and as high as 37%. E. coli was the most common organism, found in 55.5% of cases, followed by klebsiella, found in 27.78% of cases. These results are consistent with those of a study in which a total of 153 patients with a mean (SD) age of 15 months found that E. Coli was the causative organism in 41.2% of first UTI cases. Klebsiella pneumonia was the second most prevalent microorganism, seen in 19.6 percent of 101 cases.

CONCLUSION

A high percentage (6.47%) of urinary tract infection in febrile children without any focus of infection in our study favours having a heightened awareness among treating paediatricians to treat an easily manageable disease and to avoid future complications. Diagnosing UTI in children is an uphill task and missing a diagnosis in children puts these children at risk of developing chronic renal problems.

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