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Original Research Article

Study of Urinary Tract Infections in Infants with Acute Fever

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Abstract

Background: Urinary tract infection (UTI) is the most common type of severe bacterial infection. Most of the febrile infants exhibit renal parenchymal involvement. If not diagnosed properly, it may lead to hypertension and diminished renal function, which becomes a challenge to pediatricians.

Method: 85 infants admitted for fever were studied. Symptoms were increased frequency of micturition, crying while voiding, and pyuria. General and systemic examinations were done to rule them out. Phimosis, vulvular synechiae, and suprapubic mass, renal mass, dysmorphic features, and associated congenital anomalies were observed. A provisional diagnosis was done mainly based on signs and symptoms. Routine urine analysis, microscopic analysis of urine, and urine culture were carried out. Positive patients were further examined by USG and MCU, and a differential diagnosis was also done to confirm the UTI.

Results: The clinical manifestations were 85 (100%) fever, 33 (38.3%) vomiting, 48 (56.4%) irritability, 60 (70.5%) failure to thrive, 11 (12.9%) jaundice, 18 (21.1%) convulsions. The co-morbidities were 26 (30.5%) gastroenteritis, 22 (25.8%) fever without focus, 11 (12.9%) URTI, 16 (18.8%) UTI, 7 (8.23%) septicemia, 3 (3.52%) bronchitis. The highest sensitivity drug was 77 (90.5%) amikacin, followed by 50 (58.5%) norfloxacin, 61 (71.7%) ofloxacin, gentamicin, 16 (18.8%) Nitrofurantin, and 13 (15.2%) Nalidixic.

Conclusion: The prevalence rate of UTI varies by gender, age, race, and circumcision status. The present study will help the clinician to rule out causes of UTI and treat efficiently.

Keywords: Urinary Tract Infection, Renal Parenchyma, Hypertension, Macconkey Culture Media, Pyuria.

Introduction

Urinary tract infection (UTI) is the most common type of severe bacterial infection in infants presenting with fever without source (FWS), and it identifies those with a UTI [1]. Prevalence of UTI in infants with fever without source (FWS) is about 5%. However, this prevalence is not homogenous and can vary with age, sex, race, body temperature, or circumcision status [2].

For example, UTI is found in a large proportion of febrile girls aged less than 24 months and febrile boys aged less than 12 months. Infants that receive a diagnosis of UTI require special care. Most febrile infants with this diagnosis exhibit renal parenchymal involvement.

This can lead to long-term health problems, including hypertension and diminished renal function. The risk of renal impairment is greater in infants, and the diagnosis may be challenging to clinicians [3]. The signs and symptoms of a UTI are often nonspecific, and the diagnosis requires testing of a noncontaminated urine sample collected by catheterization or suprapubic aspiration [4]. Hence, an attempt is made to identify, evaluate, and treat children at risk of UTI and renal scarring and to avoid over diagnosis and over treatment.

Material and Method

85 (eighty-five) infants admitted to paediatric department of Srinivas Institute of Medical Sciences and Research Centre Suratka, Mangalore-574146, were studied.

Inclusive Criteria: Any febrile infant with an axillary temperature > 100 oF or 37.8 oC, irrespective of the provisional diagnosis. The parents or gaurdian who gave their consent was selected for study.

Exclusion Criteria: Febrile infants who had received antibiotics before attending OPD and those requiring admission, intensive care therapy,

and/or immediate antibiotics in cases of pyogenic meningitis, severe pneumonia, shock, or status epilepticus were excluded from the study.

Method: A detailed history was obtained with special emphasis on urinary symptoms such as increased frequency, crying while voiding, and pyuria. Complete general and systemic examinations were also done with attention to urological findings such as phimosis, vulvular synechiae, suprapubic mass, renal mass, dysmorphic features, and other associated congenital anomalies. A provisional diagnosis was made mainly based on presenting signs and symptoms, intake-output charts, wound site infections, and other complications. Mothers were trained through verbal instructions to collect urine using the CCU method in a sterile bottle. They were asked to clean the perineum with clean water, breast-feed the baby frequently, and apply mild pressure to the suprapubic area every 15 minutes. In routine urine analysis, urine microscopy was done using uncentrifuged urine. An observation of more than 5 pus cells/high power field (HPF) was the threshold for pyuria, a positive diagnosis of UTI [(5)]. For urine culture, the urine specimen was inoculated in MacConkey culture medium using the standard loop technique. The average time from urine collection to inoculation was 30 minutes. UTI was diagnosed only when a single uropathogen with CFU ≥ 105/mL was present, designated as significant growth. The growth of uncommon organisms such as staphylococcus, pseudomonas, and citrobacter and the growth of multiple organisms were considered signs of urine sample contamination. The culture-positive cases were tested for sensitivity by inoculating them in nutrient agar and using a combined gram-negative microbial sensitivity disk for UTI.

In culture-proven infants, further investigations such as abdominal ultrasonograms (USG), micturating cystourethrograms (MCU), and isotope scan studies were advised to determine the underlying anomalies of the renal tract. These infants were treated with appropriate antibiotics for 10 days and were asked to continue with prophylactic medication until all the imaging studies were over. Differential Diagnosis of UTI – Inflammation of the external genitalia, vulvitis, and vaginitis caused by yeast, pinworms, and other agents may be accompanied by symptoms mimicking cystitis on the basis of history and the result of urine culture. Radiologically, the hypoplastic or dysplastic kidney or a small kidney secondary to a vascular accident may appear similar to a kidney with chronic pyelonephritis; later, however, VUR (vesicoureteral reflux) is usually present. Pyuria (> WBC or HPF in a centrifuged specimen) is a hallmark of pyelonephritis with a sensitivity and specificity of 30–50%. However, pyuria alone is not sufficient for making a diagnosis, as a number of conditions are associated with sterile pyuria, including hydration, instrumentation, chemical inflammation, oral polio vaccine administration, non-specific gastroenteritis, and respiratory tract infection. Pyuria is strong, supportive evidence of UTI in the presence of a positive culture. Many (20–50%) patients with bacteriuria with UTI do not demonstrate significant pyuria. The most accurate method of measuring pyuria is to quantify the urinary leukocyte excretion rate.

The duration of the study was from April 2024 to May 2025.

Statistical analysis: Various clinical manifestations, provisional diagnosis, and antibiotic sensitivity of the organism were classified by percentage. The statistical analysis was carried out in SPSS software. The ratio of males and females was 3:1.

Observation and Results

Table 1: Clinical manifestations of UTI in infants: 85 (100%) fever, 33 (38.8%) vomiting, 48 (56.4%) irritability, 60 (70.5%) failure to thrive, 11 (12.9%) jaundice, 18 (21.1%) convulsion.

Table 2: Provisional diagnosis of UTI infants: 26 (30.5%) gastroenteritis, 22 (25.8%) fever without focus, 11 (12.9%) URTI, 16 (18.8%) UTI, 7 (8.23%) septicaemia, 3 (3.52%) bronchitis.

Table 3: Antibiotic sensitivity of organisms in urine culture samples: 77 (90.5%) Amikacin, 61 (71.7%) ofloxacin, 50 (58.8%) Norfloxacin, 35 (41.1%) gentamicin, 16 (18.8%) Nitrofuradantin, 13 (15.2%) Nalidixic acid, 8 (9.41%) ceftriaxane, and 11 (12.9%) ceftriaxone.

Table 1: Clinical manifestation of UTI Infants (No. of patients: 85)

Clinical Manifestation	No. of patients (85)	Percentage (%)
Fever	85	100%
Vomiting	33	38.8%
Irritability	48	56.4%
Failure to thrive	60	70.5%
Jaundice	11	12.9%
Convulsion	18	21.1%

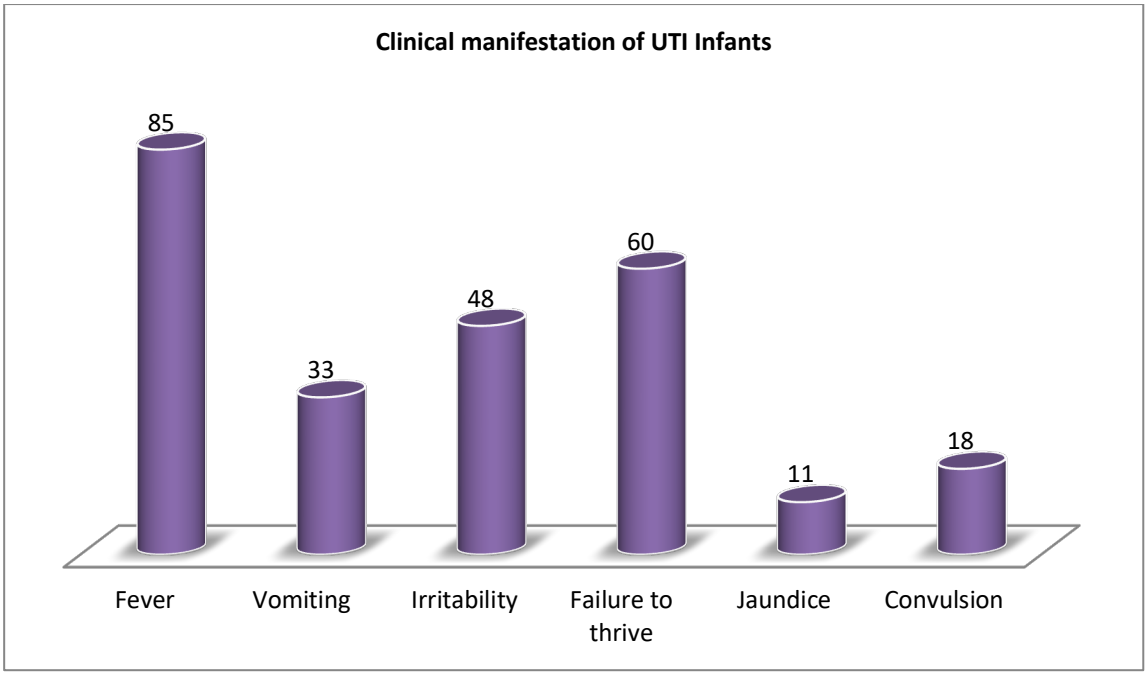

Figure 1: Clinical manifestation of UTI Infants

Table 2: Provisional diagnosis in UTI Infants (No. of patients: 85)

Provisional diagnosis	No. of Patients (85)	Percentage (%)
Gastro-enteritis	26	30.5
Fever without focus	22	25.8
Upper Respiratory tract infection (URTI)	11	12.9
Urinary tract Infection (UTI)	16	18.8
Septicaemia	7	8.23
Bronchitis	3	3.52

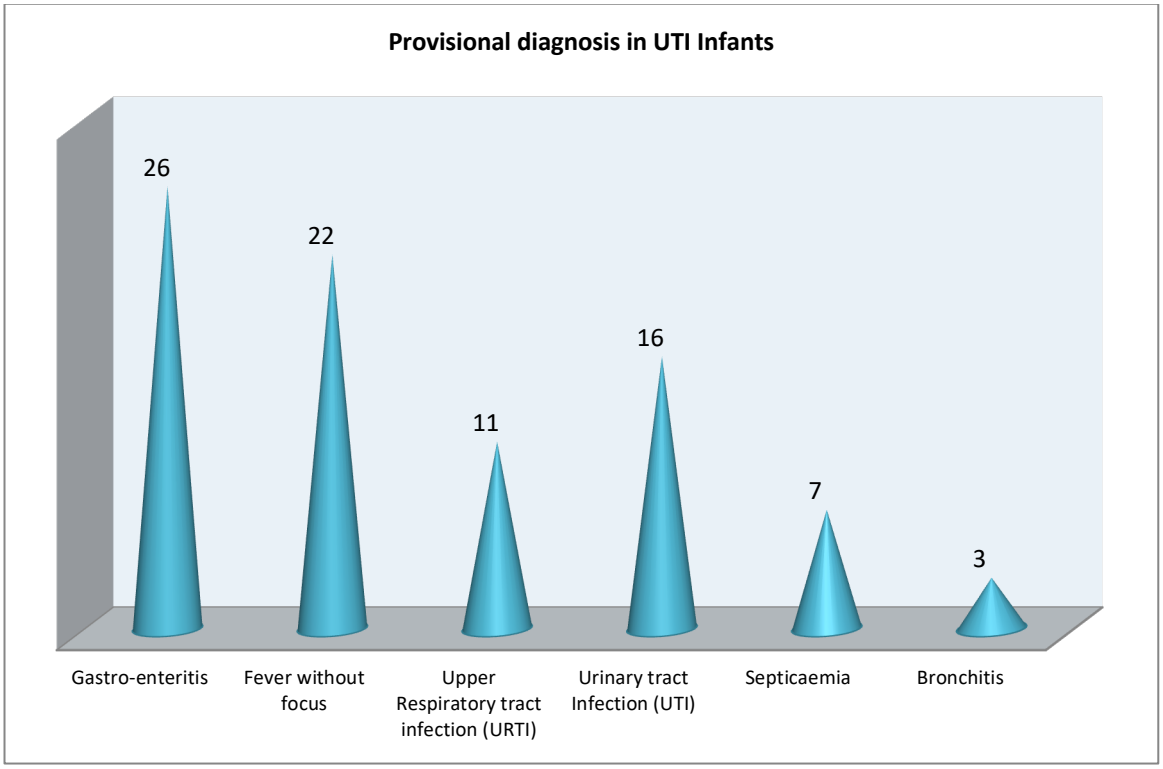

Figure 2: Provisional diagnosis in UTI Infants

Table 3: Antibiotic sensitivity of organism growing in Urine Culture samples (No. of patients: 85)

Antibiotic	No. of patients	Percentage (%)
Amikacin	77	90.5
Oflaxacin	61	71.7
Norfloxacin	50	58.8
Gentamicin	35	41.1
Nitrofurantion	16	18.8
Nalidixic Acid	13	15.2
Ceftriaxone	8	9.41
Cefixime	11	12.9
Cefotaxime	0	0.0
Co-triamozole	0	0.0

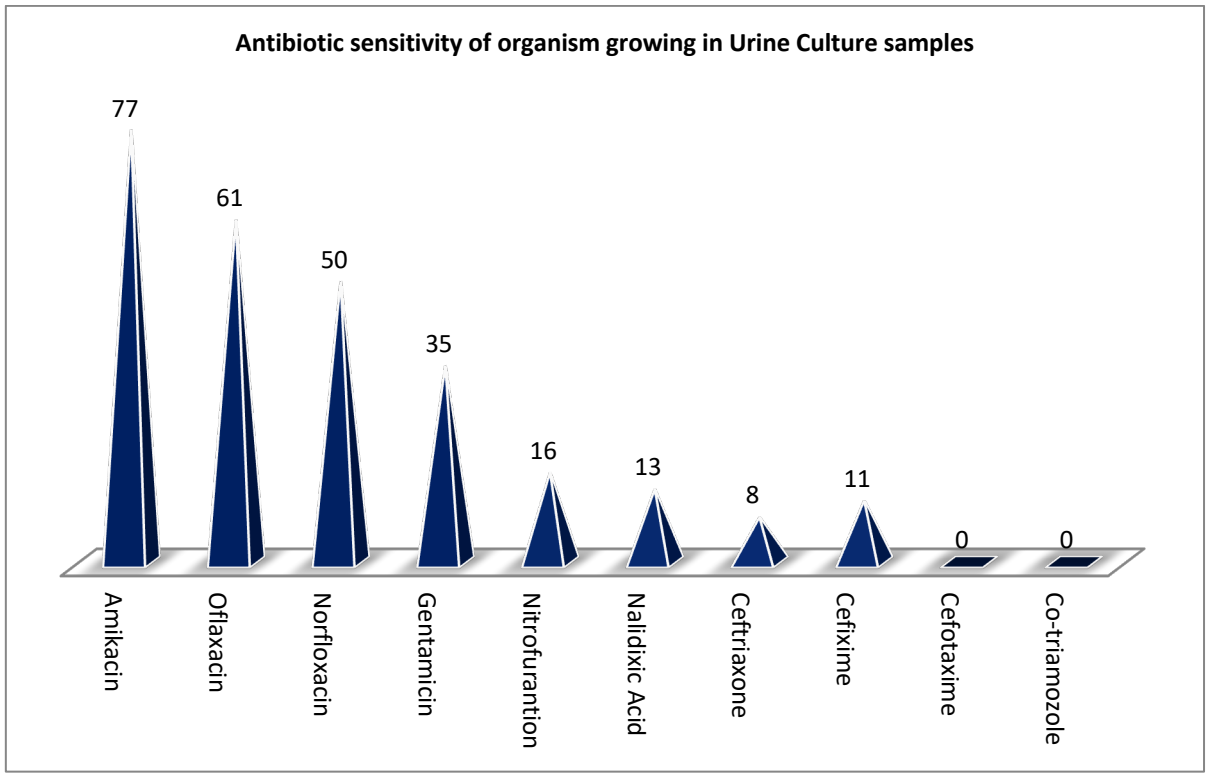

Figure 3: Antibiotic sensitivity of organism growing in Urine Culture samples

Discussion

Present study of UTI in infants with acute fever. The clinical manifestations were 85 (100%) fever, 33 (38.8%) vomiting, 48 (56.4%) irritability, 60 (70.5%) failure to thrive, 11 (12.9%) jaundice, 18 (21.1%) had convulsion (Table 1). The provisional diagnosis of UTI was 26 (30.5%) gastroenteritis, 22 (25.8%) fever without focus, 11 (12.9%) URTI, 16 (18.8%) UTI, 7 (8.23%) septicemia, and 3 (3.52%) bronchitis (Table 2). Antibiotic sensitivity of organisms growing in urine culture samples: 77 (90.5%) amikacin, 61 (71.7%) ofloxacin, 50 (58.8%) norfloxacin, 13 (15.2%) nalidixic acid, and 11 (12.9%) ceftriaxone (Table 3). These findings are more or less in agreement with previous studies [6,7,8]. UTI is a very important clinical problem and a challenge for clinicians to diagnose. The infection usually involves pyelonephritis, which affects renal function in adulthood; hence, UTI in infants must not be ignored and treated meticulously [9]. The risk of renal parenchymal damage from UTI manifested by subsequent renal scarring is strongly related to age at the time of UTI, being highest in infancy and declining markedly with increasing age [10,11]. Renal scarring is associated with the later development of hypertension, preeclampsia, eclampsia, and end-stage renal disease [12].

It is reported that urine culture is used in the diagnostic evaluation of febrile infants < 3 months of age whose history or physical examination does not suggest serious illness [13]. The presence of pyuria, defined as ≥ 5 leukocytes per high-power field, was a relatively insensitive indicator of UTI. Had urine culture been omitted because of the absence of pyuria, nearly half of the UTIs would not have been diagnosed [14]. The presence of bacteriuria, defined as any number of bacteria per

high-power field, was a more sensitive indicator, but it was not specific enough to identify infants with UTIs accurately [15].

It is also observed that UTI was higher in female children less than 2 years of age, but race or height in temperature was not correlated with UTI, but symptomatic or asymptomatic bacteria were higher in white girls than Black girls.

Several studies have reported that the dipslide culture method is valid, with standard quantitative cultures used as the gold standard in UTI of urine, and suprapubic aspiration is regarded as the ideal method for collecting urine specimens. Though it is painful, the success rate for diagnosing UTI was 23% to 90%.

Summary and Conclusion

In the present study of UTI with acute fever in infants, urine culture was carried out in every patient because urine culture was a mandatory investigation in febrile infants, as there are no other alternate sensitive techniques available for immediately diagnosing UTI in febrile infants, and except when the cause of fever in such infants is unequivocal, clinicians have to alter the possibility that febrile infants may have UTI and should consider obtaining a urine culture specimen as part of their diagnostic evaluation.

This study demands the latest techniques be explored for the immediate diagnosis of UTI in febrile infants because the present urine culture method is time-consuming and prolongs the morbidity of patients.

Limitation of Study: Owing to the remote location of the present study institution, small number of patients, lack of latest technique, we have limited findings and results.

This research work was approved by the ethical committee of Srinivas Institute of Medical Sciences and Research Centre Suratkal, Mangalore, karnataka-574146.

References

1. Elder S: Urinary tract infections. In Kliegman RM, editor Nelson's Textbook of Pediatrics 20th Vol. 1, ch. 177, 2016, 1281–82, Philadelphia Elsevier.
2. Kent A, Turner MA: Amino glycoside toxicity in neonates something to worry about? Expert Rev. Anti-Infect Ther 2014, 12; 319–31.
3. Lee GM, Fleisher GR: Management of febrile children in the age of the conjugate pneumococcal vaccine cost effectiveness analysis, Pediatrics 2001, 108: 835–44.
4. Show N, Gorelick M: Prevalence of urinary tract infection in febrile young children in the Emerging Department of Pediatrics 1998, 102; 164–08.
5. Hoberman A, Cabo HP: Prevalence of urinary tract infection in febrile lactantes J. Peadatr. 1993, 123; 17–23.
6. Plykkanen J, Vilska J: The value of diagnosis of childhood urinary tract infection in predicting renal injury Acta. Peditr. Scant 1981, 70; 879–83.
7. Mc Carthy PL: Clinical evaluation of well- and sick children Nelson text book of pediatrics, 1992, 175–6. Philadelphia W. B. Saunders.
8. Kunin CM, Duetscher R: Urinary tract infection in schoolchildren. Clinical and laboratory study. Medicine 1964, 43; 91–130
9. Badhan R, Singh DV, Badhan LR, Kaur A: Evaluation of bacteriological profile and antibiotic sensitivity patterns in children with urinary tract infection: A prospective study from a tertiary care center. Indian J Urol. 2016; 32(1):50.
10. Sharma A, Shrestha S, Upadhyay S, Rijal P: Clinical and bacteriological profile of urinary tract infection in children at Nepal Medical College Teaching Hospital. Nepal Med Coll J. 2011; 13:24–6.
11. Saheb SA: Prevalence of urinary tract infections in febrile children less than five years of age: a chart review. Int J Contemporary Pediatr. 2018; 5(2):359.
12. American Academy of Pediatrics Urinary tract infection: clinical practice guidelines for the diagnosis and management of the initial UTI in febrile infants and children aged 2 to 24 months. Paediatrics. 2011; 128(3):595-610.
13. Freedman AL: Urological Diseases in America Project Trends in resource utilization for urinary tract infections in children, J. Urol. 2005, 173; 949–54.
14. Bonadio W, Maida G: Urinary tract infection in our patient's febrile infants younger than 30 days of age, Pediatric Infect. Dis. J. 2014, 22; 342-4.
15. Neidl LS, Kamat D: Fever without Focus In; Kliegman RM, editor Nelson, text book of pediatrics, 20th edition, vol. 1, ch. 177, 2016, 1280–82 Philadelphia PA.