



Clinical profile and outcome of Infants admitted with the first episode of Urinary Tract Infection

Authors

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Abstract

Objectives: The primary objective was to analyze the clinical profile of infants admitted with Urinary Tract Infection (UTI), to study the adequacy of appropriate investigations and follow up these infants. The proportion having significant underlying abnormalities and the number requiring intervention was assessed.

Methods: All children less than one year of age, who were admitted with a diagnosis of Urinary Tract infection based on high urine WBC count or significant symptoms suggestive of UTI were included in the study. A retrospective chart review was performed and demographic data, clinical presentation, investigations and treatment details were noted. Outcome of investigations, need for antibiotic prophylaxis, breakthrough UTI and surgical interventions was noted. Data was statically noted.

Type of study-Retrospective study

Place of study: Hi-Tech medical college and Hospital, BBSR

Results: 219 children were enrolled. Urine culture was positive in 121(55.2%).Fever was the common presenting symptom in 89.9%,followed by crying during micturation in 41.1% and vomiting in 40.6%,E.coli was the most common organism isolated in 78.5% children. Ultrasound of abdomen was done in 195/219 children of which 170(87%) were normal. Micturating Cystourethrogram (MCU) was done in37/219 children (16.8%) and showed Vesicoureteric reflux in 16(43.2%).Of the 29 children (13.2%) who underwent DMSA, 17 children had renal scarring. Antibiotic prophylaxis was started in 65 children (29.7%) but breakthrough UTI occurred in 41.6% and 35 children (15.9%) were referred to pediatric surgery for opinion and management.

Conclusions: Early detection of UTI's early can prevent long term morbidity. Evaluation was not complete in the study cohort; hence underlying urological abnormalities may have been missed. MCU and DMSA need to be performed in infants even if ultrasound screening negative Better follow up of these infants is to be advocated.

Introduction

UTI is one of the most common bacterial infection in infant and young children, second to otitis media and pharyngitis and more common than pneumonia. It is one of the more common cause of fever in young children and can lead to hypertension and renal scarring. In 15-20% of children with end stage renal disease it is a result

of chronic pyelonephritis following UTI. Urinary tract infections (UTI) are one of the most common bacterial infections seen in children. It has been estimated that UTI are diagnosed in 1% of boys and 3-8% of girls. In the first year of life UTI is more prevalent in boys with rates of 2.7% compared with 0.7% in girls.⁽¹⁾

Urinary tract infection is defined as growth of a significant number of organism (10^5 organisms/ml of a single species) in urine. Significant bacteriuria refers to a single bacterial species in a mid-stream clean catch urine. UTI is one of the most common bacterial infection in infant and young children, second to otitis media and pharyngitis and more common than pneumonia.

The 3 basic forms of UTI are pyelonephritis, cystitis, and asymptomatic bacteriuria. Focal pyelonephritis (nephronia) and renal abscesses are less common. UTI in young children may be a marker for abnormalities of the urinary tract including vesico-ureteric reflux (VUR) and reflux nephropathy (renal scarring). VUR is the commonest abnormality with a prevalence of 1% in all children and 35% in children following first UTI. Data in both humans and animals have demonstrated that UTI in the presence of VUR may lead to acute pyelonephritis and renal scarring. Renal scarring is associated with subsequent renal damage, hypertension and end stage renal disease (ESRD). Reflux nephropathy has been estimated to account for 7-17% of ESRD.

UTIs are caused mainly by colonic bacteria. In girls, 75-90% of all infections are caused by *Escherichia coli*, followed by *Klebsiella* spp and *Proteus* spp. Some series report that in boys > 1 yr of age, *Proteus* is as common a cause as *E. coli*; others report a preponderance of gram-positive organisms in boys.

Recurrent UTI is defined as at least two episodes of documented UTI in the last 6 months' period or three episodes in a year (at least one episode during follow up). The reported rate of recurrent UTI is around 12- 30% with risk greater in infants < 6 months, severe vesico-ureteric reflux and abnormal nuclear renal scans at time of first infection. Looking at the prevalence of renal scarring in cases with UTI, with increase seen more in UTI with VUR, researchers have concluded that there is a cause-effect relationship of renal scarring with recurrent UTI. Thus with each episode of UTI, more complicated by

presence of renal scarring, the risk of end-stage renal disease increases.

Various diagnostic tests are recommended and employed for the diagnosis of UTI and recurrent UTI. These include various tests in urinalysis like urine routine and microscopic examination, leukocyte esterase and nitrite tests, ultrasonography, voiding cystourethrography, DMSA scan, etc. Permanent renal scar has been seen in children after an episode of UTI in 15-60% of cases. A DMSA scan can detect scar and decreased renal functioning of the kidney. DMSA stands for dimercaptosuccinic acid. A DMSA scan uses radioactive chemicals to create special pictures of the kidneys. DMSA scan can be an expensive test, involving sedation at times, long time for investigation and is considered as an invasive procedure. Adverse effects associated with it are nausea, vomiting, erythema, flushing and rarely syncope. Some people have an allergic reaction to the injected chemical.

Around 1 to 6 reactions occur per 10000 cases of injection of the radionuclide scan.

Prevalence of UTI in the hospital setting is almost like those reported elsewhere. Moreover, cases of recurrent UTI are seen frequently, and sent for investigation at one of the premier centres for investigation where DMSA scan is only available till date in the state. These patients are treated and often followed up. Yet the proportion of children who agree to opt for this invasive and expensive procedure at this tertiary centre is meagre.

Clinical features usually depend on the age of the child. Neonates usually present with lethargy, irritability, poor feeding, diarrhoea, vomiting, jaundice, weight loss and shock. In infants, UTIs most often present with subtle signs and symptoms, such as fever, vomiting, poor feeding, lethargy and irritability. Children less than 2 years present with fever, vomiting, diarrhoea, abdominal pain and poor weight gain.

Methods

All children less than one year of age, who were admitted with a diagnosis of Urinary Tract

infection based on high urine WBC count or significant symptoms suggestive of UTI were included in the study. A retrospective chart review was performed and demographic data, clinical presentation, investigations and treatment details were noted. Outcome of investigations, need for antibiotic prophylaxis, breakthrough UTI and surgical interventions was noted. Data was statically noted.

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Urine culture positive	121(55.2%)
Urine culture negative	98(44.8%)

Symptoms	percent
Fever	89.9
Fever followed by crying during micturation	41.1
Vomiting	40.6

Investigations	Percent
Ultrasound(abnormal)	25(13%)
MCU(Vesico urethral reflux)	16(43.2%)
DMSA(Renal Scarring)	17(58.6%)

Conclusions-Early detection of UTI's early can prevent long term morbidity. Evaluation was not complete in the study cohort; hence underlying urological abnormalities may have been missed.

MCU and DMSA need to be performed in infants even if ultrasound screening negative Better follow up of these infants is to be advocated.

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