

# **URINARY TRACT INFECTION IN CHILDREN**

## **Introduction**

Urinary infections are one of the commonest infections in the Paediatric age group.

## **Symptoms and signs**

The clinical presentations of urinary tract infections (UTI), in the paediatric patients are diverse and vary with age. Some of the more common symptoms and signs at different ages are listed below:-

### **Neonates and Babies**

Poor feeding, vomiting, poor weight gain, irritability, excessive crying, pyrexia, hypothermia, profoundly unwell or shocked, prolonged jaundice, unusual odour to urine, blood stained urine.

### **Toddlers and Infants**

Pyrexia, malaise, loss of appetite, vomiting, crying on micturation, abdominal pain. Loss of bladder control, frequency, enuresis. Refusal to urinate for prolonged periods, Malodorous urine, blood in urine.

### **Older Children and Teenagers**

Pain or scalding with urination. Frequency, urgency, incontinence-day or night. Lower abdominal pain, loin pain, Fever, malaise, loss of appetite,. Malodorous urine, blood in urine.

## **Diagnosing UTI**

Clinical impression is NOT sufficient for diagnosis of UTI. Even if symptoms are convincing microbiological confirmation is necessary. "Clean Catch" midstream urine collection is often the first method of urine collection. Direct urine collection by bladder aspiration, or failing this by catheterization, are the preferred methods of urine collection especially in the 'septic' neonate, of unwell baby for whom immediate antibiotic treatment is planned after collection of urine for microscopy and culture. Asymptomatic pyuria is often seen in children (pus cells in urine). Urine collected by the "Bag" method is liable to contamination in over 50% of collections. After urine collection the specimen should be transported immediately preferably in ice to the laboratory and plated as keeping it may increase chances of contamination.

## **Microbiology and Microscopy of Urine Infection**

The commonest isolates are Escherichia coli (75%), Klebsiella-Enterobacter (15%), Proteus sp. (5%), Staphylococcus (3.5%), Pseudomonas and others (1.5%). Bacteria colony counts of 10 or greater per milliliter of urine of a single

organism if confirmed, are diagnostic of UTI. Counts of 1 to 10 are suspicious and in one third of children, UTI is confirmed by direct methods of bladder urine collection. 10 organisms from a catheter specimen or ANY colony growth from a bladder aspirate are indicative of UTI. Colonisation of Bacteria can occur in any part of the Genitourinary tract.

The findings of increased leucocyte excretion in the urine (more than 10 leucocytes per cubic millimeter) in conjunction with bacteriological culture is helpful in diagnosis but a normal leucocyte count in the urine does not exclude UTI.

### **Use of the Dipstick test of Urine Infection**

A positive nitrite test which relies on conversion of urinary nitrate to nitrite by organisms, is highly predictive of growth of organisms on culture.

### **Treatment of Urinary Tract Infection**

For children with UTI who are not systemically unwell or toxic, treatment with oral antibiotics for seven days or more is suitable. Parenteral therapy, is indicated if the child is unable to tolerate oral therapy, or is very ill or in infants.

N. B. Dose and interval adjustment must be made in neonates and in renal insufficiency to avoid toxicity of antibiotics.

### **Prophylactic Antibiotics in UTI**

A single bed-time dose of oral antibiotic (as above) is usually sufficient. Long term prophylaxis is used in children with dysfunction bladders, recurrent UTI's, VUR, and so on.

Cystourethrograms should be "covered" with antibiotics.

### **Investigation of UTI in the Paediatric Patient**

Approximately 10% of patient on dialysis are there because of reflux nephropathy. Appropriate investigations coupled with preventive therapy may diminish morbidity and reduce the number of patients progressing to end stage renal disease. Approximately one third of the childhood CRF (chronic renal failure) patients have had UTI's in early childhood often associated with VUR (described below)

### **Who should be investigated?**

While there may be arguments regarding type of investigations and the order or timing of various tests, there is general agreement that ANY child who has or has had a proven UTI should be investigated. Although it is true that females are more prone to UTI beyond the neonatal age, it is NOT true that investigations should be deferred until the second episode of UTI. **A single urine infection in a child of any sex requires investigations.** Additionally, if a child is subsequently shown to have vesicoureteric reflux (VUR), siblings should also be investigated for VUR. This is because the mode of inheritance of VUR appears to be autosomal dominant. Indeed if either parent has a clear history of VUR,

their children should be also be investigated. In less than 10 years age group, a fourth of the patients with UTI are associated with VUR.

### **What investigations should be done?**

The current approach recommended is outlined (fig. 1). Children under 4 years of age should have both a micturating cystourethrogram (MCU) and imaging of the kidneys (by intravenous urography or ultrasound). If expert renal tract ultrasonography (US) is unavailable, an intravenous urogram/pyelogram (IVU/IVP) is generally satisfactory. In children over the age of 4 years, an MCU is done only if the US or IVU is abnormal, or if there are other medical indications for further investigation. The MCU may be performed by standard radiological technique or by radionuclide method. Cystoscopic examination may be required in selected cases. It has become clear in recent years that the most sensitive investigation for the detection of renal damages as a result of VUR and or renal tract infection is the Technetium dimercaptosuccinic acid scan (DMSA radionuclide scan). The DMSA scan will detect areas of scarring better than IVU and better than ultrasound. However, the test should be delayed for atleast 3 months after a urine infection has been treated. The investigations of siblings is handled in the same way as for any child with their first urinary infection. Antimicrobial "cover" is used when bladder catheterization for MCU is carried out. Referral for cystoscopic examination and surgical management is dependent on many factors including: the grade of reflux, break through infections despite adequate antimicrobial prophylaxis, demonstrated renal damage or reduced likelihood of longterm compliance with management plan.

### **Recent Advances**

Good ultrasound facilities these days, pick up fetal renal abnormalities like pelvicalyceal renal dilatation and hydronephroses antenatally. Early intervention and management can thus be planned for.

## **Algorithm for management of urinary tract infection in children**

