

Indian Academy of Pediatrics (IAP)



STANDARD TREATMENT GUIDELINES 2022



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Urinary Tract Infection in Children

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Urinary Tract Infection in Children

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Introduction

Urinary tract infection (UTI) is a common bacterial infection in young children. Delay in diagnosis and treatment can lead to irreversible and long-term damage to the developing kidneys. It may result in renal scarring, hypertension, and renal insufficiency.

Diagnosis of UTI in young children is made in presence of:

- ☑ Symptoms such as fever, dysuria, urgency, frequency, abdominal/flank pain in older children and fever, vomiting, diarrhea, and poor weight gain in infants *PLUS*
- ☑ Positive dipstick for leukocyte esterase and nitrite (*as a screening tool*)
- ☑ Abnormal urinalysis with significant pyuria and bacteriuria *AND*
- ☑ Isolation of single species of microorganism in significant number in a properly collected urine sample prior to starting antimicrobial therapy and tested for urine culture (*gold standard*)

Asymptomatic bacteriuria is considered in presence of:

- ☑ Significant bacteriuria in absence of pyuria or symptoms
- ☑ More common in girls compared to boys
- ☑ Often associated with nonvirulent *Escherichia coli* colonization
- ☑ Ideally should not be treated with unnecessary antimicrobials

Significant bacteriuria: It is based on the colony count in the urine culture and method of collection (**Table 1**).

Table 1: Colony count in the urine culture and methods of collection.

Method of collection	Colony count (per mL)
Suprapubic aspiration	Any number
Urethral catheterization	$>10^4$
Midstream void	$>10^5$

Bacteriuria

Risk Factors

Risk factors for UTI in young children (look for presence of any of these in your patient):

- ☑ Poor perineal hygiene and unnecessary use of diapers
- ☑ Congenital anomalies of kidney and urinary tract (CAKUT) such as vesicoureteric reflux, pelvic ureteric junction obstruction, obstructive uropathy, abnormal communication between urinary tract and gastrointestinal tract, phimosis in boys, vulval synechiae in girls, and renal stones
- ☑ *Bowel bladder dysfunction (BBD)* presenting with features of urinary urgency, frequency, dysuria, voiding postponement during the toilet training age group, incontinence, and constipation
- ☑ *Almost 50% children with recurrent UTI and 10% children presenting with a single UTI have an associated urological abnormality*
- ☑ *Fungal UTI* is more common in immunocompromised patients, intensive care unit (ICU) setting, prolonged antibiotic usage, and in presence of indwelling catheters

Common organisms

Common organisms causing UTI are:

- ☑ *E. coli* in >70% cases
- ☑ Uncommon organisms—non-*E. Coli* bacteria and fungi

Sample Collection

Ideal sample of urine for urine culture for diagnosis of UTI in young children:

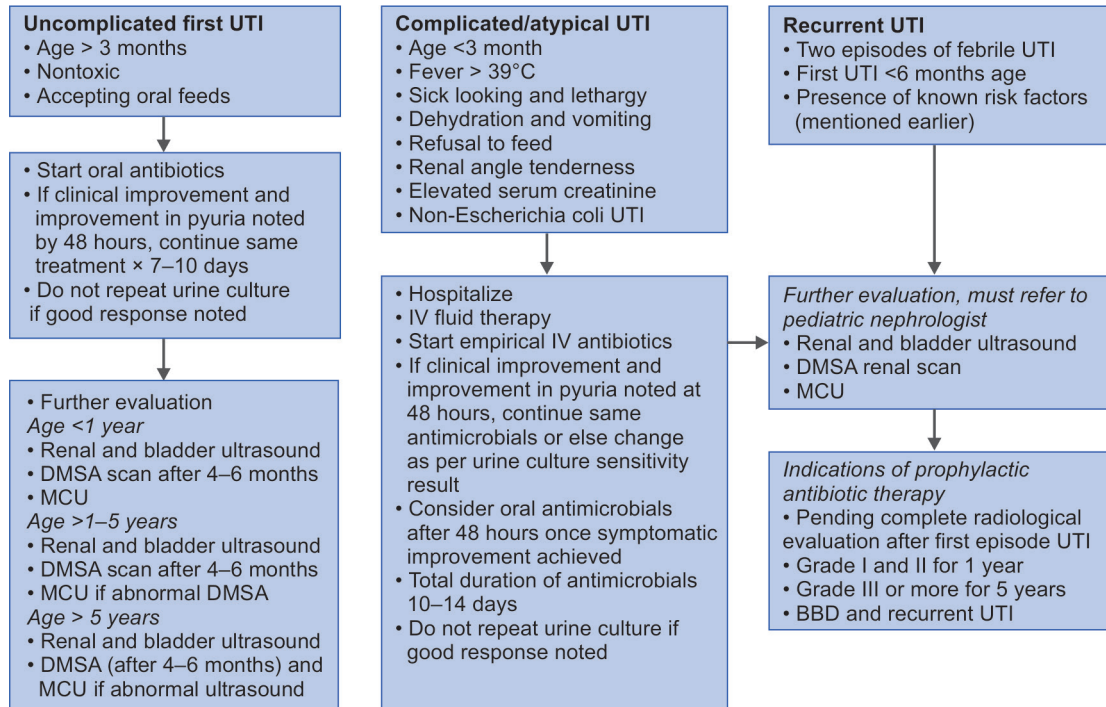
- ☑ *Toilet-trained children:* Midstream collected urine by clean catch method (most preferred, noninvasive practical method). Genital area should be cleaned properly with soap and water before collecting midstream urine sample.
- ☑ *Non-toilet-trained children:* Simple urethral catheterization **OR** Suprapubic aspiration

Note: Urine sample should never be collected from urobag or minicom in neonates, infants, and older children.

Urine sample should be processed as soon as possible ideally within 30 minutes of collecting the sample to avoid contamination and incorrect result.

Treatment and evaluation of UTI in young children should be prompt and as per the nature of its presentation (**Flowchart 1**).

Flowchart 1: Approach to a child with UTI as per clinical presentation.



Common antimicrobials for treatment of UTI in children are presented in **Table 2**.

TABLE 2: Common antimicrobials for treatment of urinary tract infection (UTI) in children.

Antimicrobials	Dose (mg/kg/day)	Remarks
<i>Oral</i>		
Cefixime	10 in two divided doses	Good effective empirical broad spectrum agent
Amoxicillin or co-amoxiclav	30–50 in two divided doses	May consider for uncomplicated UTI
Cephalexin	30–50 in three divided doses	
Cefadroxil	30–40 in two divided doses	
<i>Parenteral</i>		
Amikacin	10–15 in one to two divided doses	Once a day dosing is effective
Gentamicin	5–6 in one to two divided doses	
Cefotaxime	100 in two to three divided doses	Safe and effective as monotherapy
Ceftriaxone	75–100 in one to two divided doses	
<i>Prophylaxis</i>		
Cotrimoxazole	1–2 of trimethoprim	Avoid below 3 months and in glucose-6-phosphate dehydrogenase (G6PD) deficiency
Trimethoprim		
Nitrofurantoin	1–2	
Cephalexin	10	Safer option in infancy
Cefadroxil	3–5	

Follow-up and Monitoring

Further follow-up and monitoring:

- ☑ Aim for symptomatic improvement, complete and sustained resolution of fever, and return of normal well being
- ☑ Document normal urine analysis at the end of treatment of current UTI
- ☑ Do not repeat urine culture unless there is a new UTI/breakthrough UTI
- ☑ Periodic monitoring of growth
- ☑ Urine analysis during further febrile episodes in presence of a known risk factor for UTI
- ☑ Blood pressure evaluation once in 6–12 months
- ☑ Assess renal function once a year in a child who had severe complicated UTI or recurrent UTI
- ☑ Watch for proteinuria after successful treatment of UTI, it may be associated with pyelonephritic renal scarring and would need medical intervention

- ☑ Indian Society of Pediatric Nephrology, Vijayakumar M, Kanitkar M, Nammalwar BR, Bagga A. Revised statement on management of urinary tract infections. Indian Pediatr. 2011;48(9):709-17.

Further Reading