

# (Pediatric Urinary Tract Infection)

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In a previous pediatric pearl, we discussed how to treat febrile infants below 60 days. This pearl discussed management of pediatric urinary tract infection (UTI), but also discusses patients above the age of 60 days with a fever with no obvious source in whom UTI as a source.

## History and Physical

### History

Duration of fever  
 Symptoms that suggest an alternative source  
 Hydration status  
 History of recurring fever without source  
 History of UTI  
 History of constipation  
 Dysfunctional voiding by history  
 FH of vesicoureteral reflux (VUR) or renal diseases



### Physical

Vital signs  
 Suprapubic, flank tenderness  
 Abdominal mass, palpable bladder  
 Evidence of spinal lesion  
 Other GU abnormalities

## Signs and Symptoms of UTI: Most common to least common\*

<b>Infants &lt; 3 months</b>	Fever Vomiting Lethargy Irritability	Poor feeding Failure to thrive	Abdominal pain Jaundice Haematuria Offensive urine
<b>Infants &gt; 3 months – preverbal</b>	Fever	Abdominal pain Loin tenderness Vomiting Poor feeding	Lethargy Irritability Haematuria Offensive urine Failure to thrive
<b>Verbal – 18 years</b>	Frequency Dysuria	Dysfunctional voiding Changes to continence Abdominal pain Loin tenderness	Fever Malaise Vomiting Haematuria Offensive urine Cloudy urine

\*NICE Guidelines on pediatric UTIs

## Risk factors for UTI

Infants >56 days who are not toilet trained

<b>Female risk factors</b> <ul style="list-style-type: none"> <li>- Non-black</li> <li>- T ≥ 39°C</li> <li>- Fever ≥ 2 days</li> <li>- No source</li> <li>- &lt; 12 months</li> </ul> <p>&gt;3 risk factors <b>consider</b> screening            &gt;4 risk factors <b>recommend</b> screening</p>	<b>Male risk factors</b> <ul style="list-style-type: none"> <li>- Non-black</li> <li>- T ≥ 39°C</li> <li>- Fever ≥ 2 days</li> <li>- No source</li> <li>- &lt; 6 months</li> </ul> <p>Circumcised:            ≥ 3 <b>consider</b> screening            ≥ 4 <b>recommend</b> screening            Uncircumcised:            ≥ 2 <b>consider</b> screening            ≥ 3 <b>recommend</b> screening</p>	<b>Fully toilet trained – 18 yrs</b> <ul style="list-style-type: none"> <li>- Symptoms referable to urinary tract</li> <li>- Prior history of UTI, fever ≥ 2 days</li> <li>- Prolonged fever (≥ 5 days)</li> </ul> <p><b>Recommend</b> screening for any of the above factors</p>
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# TO CATH OR NOT TO CATH?

The AAP recommends obtaining a catheterized specimen for diagnosis of UTI, but this is a level C recommendation.

Upon further reading they basically state a bagged specimen is acceptable as well.

**SO BASICALLY, GET THE URINE IN WHATEVER WAY YOU CAN.**



## UTI Definition

### DEFINITE UTI

Catheterization → >50,000 cfu/ml

Clean catch → >100,000 cfu/ml

Leukocyte esterase and nitrite positive

Nitrite positive, leukocyte esterase negative

Pyuria and bacteriuria positive

Bacteriuria positive and pyuria negative

### POSSIBLE UTI

Catheterization → >10,000 cfu/ml

Clean catch → >50,000 cfu/ml

Leukocyte esterase positive, nitrite negative = only treat if good evidence for UTI

Leukocyte esterase and nitrite negative = no UTI

Pyuria positive and bacteriuria negative = only treat for UTI if have good evidence

Bacteriuria and pyuria negative = no UTI

### **Whom to send cultures on:**

- Infants and children who are suspected to have acute pyelonephritis/upper urinary tract infection
- Infants under 3 months
- Infants and children with a positive result for leukocyte esterase or nitrite – **SO BASICALLY EVERY POSITIVE URINALYSIS SHOULD BE CULTURED**
- Infants and children with recurrent UTI
- Infants and children with an infection that does not respond to treatment within 24–48 hours, if no sample has already been sent

## Urine Pathogens

E. coli, Proteus sp.  
Enterococcus sp.  
Pseudomonas sp.  
Serratia sp.  
Corynebacterium Urealyticum  
Klebsiella sp.  
Enterobacter sp.

Group B streptococci  
Staphylococcus aureus

## Common Contaminants

Lactobacillus sp.  
Corynebacterium sp.  
Coagulase-negative staphylococci  
Alpha-hemolytic streptococci



## ANTIBIOTICS

### Oral vs. Parenteral Antibiotics

- Most patients will tolerate oral antibiotics. Patients should receive parenteral antibiotics if patient is ill appearing, not able to tolerate PO, or has any other contraindication to oral antibiotics.

Antibiotics are recommended for 7-14 days. Shorter courses result in spread of infection and renal scarring.

PARENTERAL ANTIBIOTICS	ORAL ANTIBIOTICS
Ceftriaxone 75 mg/kg Q24h	Amox-clav 20-40 mg/kg divided into Q8h
Cefotaxime 150 mg/kg divided into Q6-8h	TMP 6-12 mg/kg SMX 30-60 mg/kg divided into Q12h
Ceftazidime 100-150 mg/kg divided into Q8h	Cefixime 8 mg/kg Q daily
Gentamicin 7.5 mg/kg divided into Q8h	Cefpodoxime 10 mg/kg divided into Q12h
Tobramycin 5 mg/kg divided into Q8h	Cefuroxime 20-30 mg/kg divided into Q12h
Piperacillin 300 mg/kg divided into Q6-8h	Cephalexin 50-100 mg/kg divided into Q6h

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## ADMISSION CRITERIA

- Toxic appearance
- Dehydration requiring IVF
- Failed outpatient therapy
- Febrile infants < 60 days
- Non-febrile infants 31-60 days can be considered for outpatient therapy if they have good follow up within 24 hours

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## IMAGING

### **ALL patients should have a renal bladder US (RBUS) after their first febrile UTI.**

RBUS should be obtained after the patient has recovered from the acute infection (4-6 weeks). Studies have shown that in the acute phase can have false positives due to structural changes that are transient caused by the infection, such as hydronephrosis. *(THIS IS FOR THE OUTPATIENT PHYSICIAN)*

Obtain the RBUS during acute illness if: Hospitalized; Ill, concern for sepsis; Abdominal, pelvic mass; Inadequate response to 48 hours of therapy.

### **Voiding cystourethrogram (VCUG) should not be obtained routinely after first febrile UTI.**

Obtain VCUG if RBUS is abnormal.

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## REFERENCES:

1. CHOP Clinical Pathways
2. Seattle Children's Hospital Clinical Pathways
3. AAP Guidelines on UTI
4. NICE Guidelines on UTI