

(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*

Infants < 3 months	Fever Vomiting Lethargy Irritability	Poor feeding Failure to thrive	Abdominal pain Jaundice Haematuria Offensive urine
Infants > 3 months – preverbal	Fever	Abdominal pain Loin tenderness Vomiting Poor feeding	Lethargy Irritability Haematuria Offensive urine Failure to thrive
Verbal – 18 years	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

Female risk factors <ul style="list-style-type: none"> - Non-black - T ≥ 39°C - Fever ≥ 2 days - No source - < 12 months <p>>3 risk factors consider screening >4 risk factors recommend screening</p>	Male risk factors <ul style="list-style-type: none"> - Non-black - T ≥ 39°C - Fever ≥ 2 days - No source - < 6 months <p>Circumcised: ≥ 3 consider screening ≥ 4 recommend screening Uncircumcised: ≥ 2 consider screening ≥ 3 recommend screening</p>	Fully toilet trained – 18 yrs <ul style="list-style-type: none"> - Symptoms referable to urinary tract - Prior history of UTI, fever ≥ 2 days - Prolonged fever (≥ 5 days) <p>Recommend 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
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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

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

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.

REFERENCES:

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