

A 23-month-old girl is brought to the emergency department with fever and abdominal pain. She was in her usual state of health until 2 days earlier, when she cried while urinating. Today her parents saw a small amount of blood in the urine, which they said smelled foul. The patient's temperature is 38.9 C (102 F), blood pressure is 96/62 mm Hg, pulse is 130/min, and respirations are 20/min. Physical examination shows suprapubic tenderness and left costovertebral angle tenderness. Complete blood count shows leukocytosis. Serum creatine and electrolytes are normal. Catheterized urinalysis results are as follows:

Specific gravity	1.013
Protein	None
Blood	Moderate
Glucose	Negative
Ketones	Negative
Leukocyte esterase	Positive
Nitrites	Positive
Bacteria	Moderate
White blood cells	50+/hpf
Red blood cells	20-30/hpf
Casts	None
Crystals	None

A urine culture grows 100,000 colony-forming units/mL of *Escherichia coli*. The girl is started on antibiotics, and her fever and pain resolve on the second day of hospitalization. In addition to completing the current course of antibiotics, which of the following is the most appropriate next step in management of this patient?

- ☐ A. No further studies
- ☐ B. Renal and bladder ultrasound
- ☐ C. Repeat complete blood count
- ☐ D. Repeat urine culture
- ☐ E. Start daily antibiotic prophylaxis

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- ☐ F. Voiding cystourethrogram

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- ☐ A. No further studies [20%]
- ☒ B. Renal and bladder ultrasound [48%]
- ☐ C. Repeat complete blood count [1%]
- ☐ D. Repeat urine culture [8%]
- ☐ E. Start daily antibiotic prophylaxis [0%]

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- ☐ E. Start daily antibiotic prophylaxis [0%]
- ☐ F. Voiding cystourethrogram [21%]

Proceed to Next Item

Explanation:

User Id: [REDACTED]

Indications for renal & bladder ultrasound

- Infants and children age < 24 months with a first febrile UTI
- Recurrent febrile UTIs in children of any age
- UTI in a child of any age with a family history of renal or urologic disease, hypertension, or poor growth
- Children who do not respond to appropriate antibiotic treatment

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This child's clinical presentation and laboratory studies are consistent with her first urinary tract infection (UTI). The fever, dysuria, and suprapubic/flank pain are suggestive of renal involvement. **Pyuria** (≥ 5 white blood cells/hpf) and **bacteriuria** (50,000 colony-forming units/mL from a catheterized specimen) confirm the infection. Children **age <2 years** are at increased risk of complications from UTI and should be treated with 1-2 weeks of antibiotics. In addition, all children age <2 years with a first febrile UTI should undergo a **renal and bladder ultrasound** to evaluate for any anatomic abnormalities that might predispose the child to UTIs. Ideally, the ultrasound is performed after improvement of fever and symptoms to minimize false positive results from acute inflammation. If the patient has persistent or worsening symptoms, an ultrasound should be performed immediately to assess for renal abscess.

(Choice A) Older children and adults generally do not need further evaluation of a first-time UTI due to lower likelihood of predisposing anatomic issues, lower risk of

urinary tract infection (UTI). The fever, dysuria, and suprapubic/ flank pain are suggestive of renal involvement. **Pyuria** (≥ 5 white blood cells/hpf) and **bacteriuria** (50,000 colony-forming units/mL from a catheterized specimen) confirm the infection. Children **age <2 years** are at increased risk of complications from UTI and should be treated with 1-2 weeks of antibiotics. In addition, all children age <2 years with a first febrile UTI should undergo a **renal and bladder ultrasound** to evaluate for any anatomic abnormalities that might predispose the child to UTIs. Ideally, the ultrasound is performed after improvement of fever and symptoms to minimize false positive results from acute inflammation. If the patient has persistent or worsening symptoms, an ultrasound should be performed immediately to assess for renal abscess.

(Choice A) Older children and adults generally do not need further evaluation of a first-time UTI due to lower likelihood of predisposing anatomic issues, lower risk of complications, and lower risk of recurrent UTI.

(Choices C and D) Repeat blood work and urine culture should be performed only in children who fail to improve after 2-3 days of appropriate antibiotics. These studies are not indicated to prove a "cure" in children with obvious symptomatic improvement.

(Choice E) Daily prophylactic antibiotics can be considered in patients with recurrent UTIs or evidence of high-grade vesicoureteral reflux. They are generally not indicated in children with a first febrile UTI.

(Choice F) A voiding cystourethrogram can be considered if hydronephrosis or scarring is seen in renal ultrasound. It is also indicated in newborns age <1 month and children age <2 years with recurrent UTIs or a first UTI from an organism other than *Escherichia coli*.

Educational objective:

Children age <2 years with a first febrile urinary tract infection (UTI) should be treated with 1-2 weeks of antibiotics. A renal and bladder ultrasound should be ordered to evaluate for abnormalities that lead to recurrent UTIs. Voiding cystourethrogram is generally not indicated for a first febrile UTI unless there are abnormalities on renal ultrasound or if the patient is a neonate.

References:

1. [Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months.](#)
2. [Does early treatment of urinary tract infection prevent renal damage?](#)