

A 7-month-old boy is brought to the physician due to fever, fussiness, and decreased wet diapers for the past week. He has no medical problems and takes no medications. His immunizations are up-to-date. His temperature is 39.4 C (103 F). Examination shows a tired-appearing boy with an uncircumcised penis. Laboratory results are as follows:

Complete blood count

Hemoglobin	13 g/dL
Hematocrit	40%
Platelets	205,000/ μ L
Leukocytes	15,800/ μ L
Neutrophils	80%

Serum chemistry

Sodium	135 mEq/L
Potassium	4.5 mEq/L
Chloride	100 mEq/L
Bicarbonate	26 mEq/L
Blood urea nitrogen	20 mg/dL
Creatinine	1.4 mg/dL

Which of the following is the best next step in management of this patient?

- ☐ A. Abdominal ultrasound
- ☐ B. Clean-catch urinalysis and urine culture
- ☐ C. CT scan of the abdomen
- ☐ D. Intravenous pyelogram
- ☐ E. Urethral catheterization, urinalysis, and urine culture

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Which of the following is the best next step in management of this patient?

- ☐ A. Abdominal ultrasound [6%]
- ☐ B. Clean-catch urinalysis and urine culture [23%]
- ☐ C. CT scan of the abdomen [1%]
- ☐ D. Intravenous pyelogram [1%]
- ☒ E. Urethral catheterization, urinalysis, and urine culture [69%]

Proceed to Next Item

Explanation:

User Id:

Diagnostic tests in urinary tract infections	
Serum BUN & creatinine	Estimate renal function
Urine dipstick	Qualitative measurement of urine properties
Urinalysis	Quantitative measurement of urine properties
Urine culture	Identification, quantification & susceptibility testing of bacterial colonies

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Urinary tract infections (UTIs) in infants and toddlers must be diagnosed and treated promptly as they usually involve the kidneys (pyelonephritis). Risk factors include girls at any age (short urethra), uncircumcised boys age ≤ 1 , and underlying renal anomaly (eg, vesicoureteral reflux, posterior urethral valves). During infancy, symptoms are nonspecific and vague (eg, fever, fussiness, decreased urine output); abdomen/flank pain and dysuria can be difficult to recognize as infants are nonverbal. The presence of **fever $>39^{\circ}\text{C}$ (102.2°F)** in any child age <3 should prompt evaluation for occult UTI.

Serum blood urea nitrogen (BUN) and creatinine and urinalysis are quick, noninvasive, preliminary tests that should be done in all infants with illnesses involving the urinary tract. The BUN and creatinine provide a general sense of the patient's hydration status and degree of renal impairment. Urine dipsticks are also commonly performed, but they have a high rate of false-positive and negative results. Microscopic **urinalysis** is more accurate as it provides quantitative data on the degree of inflammation of the urinary tract (eg, number of white blood cells). A urine **culture** can identify bacteria type and antibiotic susceptibility. Patients who have received multiple antibiotic courses are at risk for resistant organisms.

A mid-stream clean-catch (**Choice B**) urine specimen is appropriate testing for patients who do not wear diapers. The external genitalia should be thoroughly cleaned to prevent contamination by skin flora. However, infants and toddlers in diapers should undergo **straight catheterization** of the urethra to obtain a sterile urine specimen. Clean-catch specimens are unreliable in diapered patients due to a high likelihood of stool or skin flora confounding the result.

(**Choice A**) Abdominal ultrasonography is the preferred imaging screening modality for

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(**Choice A**) Abdominal ultrasonography is the preferred imaging screening modality for renal disease in children due to its lack of radiation. However, the priority in this patient is to obtain urinalysis and urine culture, followed by antibiotics.

(**Choice C**) Noncontrast abdominal CT scan is the gold standard for diagnosing nephrolithiasis. This patient's fever, leukocytosis, elevated creatinine, and young age make UTI more likely.

(**Choice D**) Intravenous pyelogram was previously the gold standard for delineating renal disease. It is now rarely used due to substantial radiation exposure and ready access to renal ultrasound and CT imaging.

Educational objective:

Urinalysis and urine culture should be performed as preliminary studies in all children with suspected urinary tract infection. Patients in diapers should undergo straight catheterization to obtain a sterile specimen and avoid contamination with stool or skin flora.

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.**