ACR Appropriateness Criteria® Urinary Tract Infection—Child

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Abstract

Urinary tract infection (UTI) is common in young children and may cause pyelonephritis and renal scarring. Long-term complications from renal scarring are low. The role of imaging is to evaluate for underlying urologic abnormalities and guide treatment. In neonates there is increased risk for underlying urologic abnormalities. Evaluation for vesicoureteral reflux (VUR) may be appropriate especially in boys because of higher prevalence of VUR and to exclude posterior urethral valve. In children older than 2 months with first episode of uncomplicated UTI, there is no clear benefit of prophylactic antibiotic. Ultrasound is the only study that is usually appropriate. After the age of 6 years, UTIs are infrequent. There is no need for routine imaging as VUR is less common. In children with recurrent or complicated UTI, in addition to ultrasound, imaging of VUR is usually appropriate. Renal cortical scintigraphy may be appropriate in children with VUR, as renal scarring may support surgical intervention.

The American College of Radiology Appropriateness Criteria are evidence-based guidelines for specific clinical conditions that are reviewed annually by a multidisciplinary expert panel. The guideline development and revision include an extensive analysis of current medical literature from peer reviewed journals and the application of well-established methodologies (RAND/UCLA Appropriateness Method and Grading of Recommendations Assessment, Development, and Evaluation or GRADE) to rate the appropriateness of imaging and treatment procedures for specific clinical scenarios. In those instances where evidence is lacking or equivocal, expert opinion may supplement the available evidence to recommend imaging or treatment.

Key Words: Appropriateness Criteria, Appropriate Use Criteria, AUC, children, pyelonephritis, renal scarring, urinary tract infection, vesicoureteral reflux

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The American College of Radiology seeks and encourages collaboration with other organizations on the development of the ACR Appropriateness Criteria through society representation on expert panels. Participation by representatives from collaborating societies on the expert panel does not necessarily imply individual or society endorsement of the final document. Reprint requests: publications@acr.org

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ACR Appropriateness Criteria® Urinary Tract Infection—Child. Variants 1 to 4 and Table 1.

Variant 1. Age <2 months, first febrile urinary tract infection.

Radiologic Procedure	Rating	Comments	RRL
US kidneys and bladder	9		○
X-ray voiding cystourethrography	6	Consider this procedure in boys and in the presence of sonographic abnormality.	☢☢
Tc-99m pertechnetate radionuclide cystography	5	Consider this procedure in girls.	☢
Tc-99m DMSA renal cortical scintigraphy	3	This procedure is not a first-line test. It could be used 4 to 6 months after UTI to detect scarring.	☢☢☢

Note: Rating Scale: 1,2,3 = usually not appropriate; 4,5,6 = may be appropriate; 7,8,9 = usually appropriate. RRL = relative radiation level.

Variant 2. Age >2 months and ≤6 years, first febrile urinary tract infection with good response to treatment.

Radiologic Procedure	Rating	Comments	RRL
US kidneys and bladder	7	This procedure has a low yield, especially if US in the third trimester is normal.	○
X-ray voiding cystourethrography	4		☢☢
Tc-99m pertechnetate radionuclide cystography	4		☢
Tc-99m DMSA renal cortical scintigraphy	3		☢☢☢

Note: Rating Scale: 1,2,3 = usually not appropriate; 4,5,6 = may be appropriate; 7,8,9 = usually appropriate. RRL = relative radiation level.

Variant 3. Age >6 years, first febrile urinary tract infection with good response to treatment.

Radiologic Procedure	Rating	Comments	RRL
US kidneys and bladder	5	This procedure may be appropriate but there was disagreement among panel members on the appropriateness rating as defined by the panel's median rating.	○
X-ray voiding cystourethrography	3		☢☢
Tc-99m pertechnetate radionuclide cystography	3		☢
Tc-99m DMSA renal cortical scintigraphy	2		☢☢☢

Note: Rating Scale: 1,2,3 = usually not appropriate; 4,5,6 = may be appropriate; 7,8,9 = usually appropriate. RRL = relative radiation level.

Variant 4. Child. Atypical (poor response to antibiotics within 48 hours, sepsis, poor urine stream, raised creatinine, or non–*E coli* UTI) or recurrent febrile urinary tract infection.

Radiologic Procedure	Rating	Comments	RRL
US kidneys and bladder	9	This is a complementary procedure.	○
X-ray voiding cystourethrography	7	This is a complementary procedure.	☢☢
Tc-99m pertechnetate radionuclide cystography	7	This procedure is an alternative for cystourethrography. Consider it in girls.	☢
Tc-99m DMSA renal cortical scintigraphy	6	This procedure could be used 4 to 6 months after UTI to detect scarring.	☢☢☢
CT abdomen and pelvis with IV contrast	4	This procedure is indicated in patients with suspected abscess.	☢☢☢☢
CT abdomen and pelvis without IV contrast	2	This procedure may be useful in rare cases when stone disease is suspected.	☢☢☢☢
CT abdomen and pelvis without and with IV contrast	1		☢☢☢☢

Note: Rating Scale: 1,2,3 = usually not appropriate; 4,5,6 = may be appropriate; 7,8,9 = usually appropriate. RRL = relative radiation level.