



UTI in febrile infants

Revised guideline discourages routine voiding cystourethrography

by Kenneth B. Roberts, M.D., FAAP

A revised AAP clinical practice guideline on the diagnosis and management of the initial urinary tract infection (UTI) in febrile infants and young children is markedly different from the previous practice parameter published in 1999.

Urinary Tract Infection: Clinical Practice Guideline for the Diagnosis and Management of the Initial UTI in Febrile Infants and Children 2 to 24 Months, was released electronically in late August and is published in the September issue of *Pediatrics* (2011;128:595-610; <http://pediatrics.aappublications.org/cgi/doi/10.1542/peds.2011-1330>). A technical report accompanies the guideline (*Pediatrics*. 2011;128:e749-e770).

New data have become available in the past five years, with the findings prompting a reexamination of the older studies. There also is a more transparent process for reporting the strength of recommendations, based on explicit assessments of benefits, harms/risks/costs, value judgments, role of patient preferences, exclusion and intentional vagueness where it appears.

Recommendations now are called Key Action Statements, and there are seven of them: Three deal with diagnosis, one with treatment, two with imaging and one with follow-up.

The changes from the 1999 recommendations are summarized as follows:

1. Diagnosis: The criteria for diagnosis now include an abnormal urinalysis as well as a positive culture containing $\geq 50,000$ colony forming units/milliliter of a urinary pathogen. The abnormal urinalysis helps distinguish true UTI from asymptomatic bacteriuria. Guidance also is provided regarding assessment of the likelihood of UTI to help determine which febrile infants clinicians should evaluate for UTI.

2. Treatment: Oral therapy is recognized as effective as parenteral therapy.

3. Imaging: Renal-bladder ultrasonography (RBUS) should be performed, but voiding cystourethrography (VCUG) no longer is recommended routinely after the first febrile UTI. Indications for

VCUG include findings on RBUS that suggest the presence of high grade vesicoureteral reflux or the recurrence of a febrile UTI.

4. Follow-up: Emphasis should be on counseling families to seek medical evaluation promptly for UTI during future febrile illnesses.

The rationale for the biggest change — discouraging the routine performance of VCUGs — stems from analysis of the six recent randomized controlled trials of prophylaxis vs. no prophylaxis in young infants following a febrile UTI. The committee that developed the guideline contacted the authors of the six studies, requesting specific data from the studies to enhance comparability and optimal meta-analysis. All six authors contributed their data, resulting in a dataset of 1,091 infants with grades I-IV reflux or no reflux.

Prophylaxis was not demonstrated to be superior to no prophylaxis in preventing recurrence of febrile UTI in infants without reflux or in those with grades I-IV reflux. (In the studies, only five infants with grade V reflux were included, so the effectiveness of prophylaxis for infants with this grade of reflux is not known, but less than 1% of febrile infants with UTI have grade V reflux.)

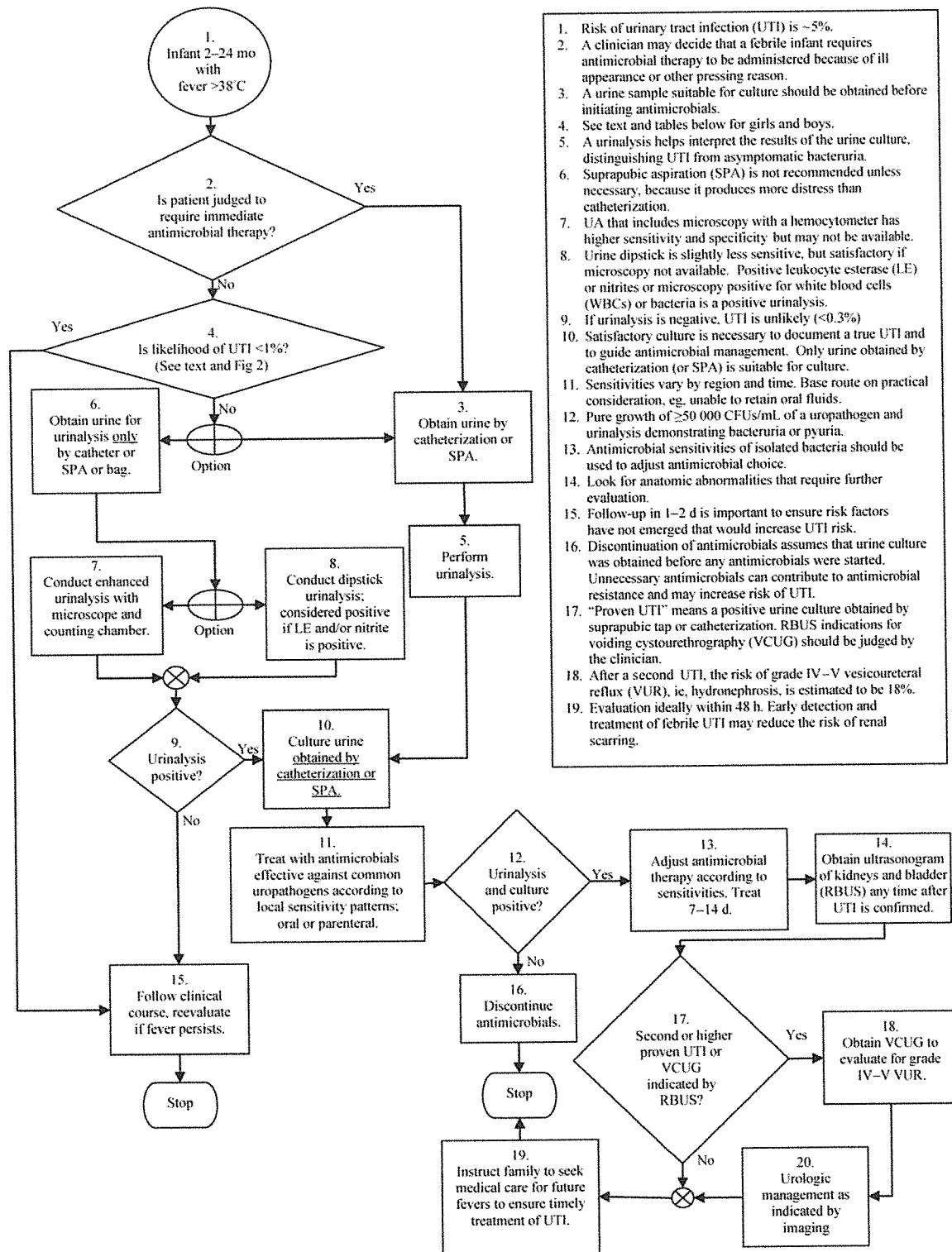
Recurrent febrile UTI is less common among infants without high grade reflux, so waiting for the second UTI reduces the number of VCUGs performed by 90% and has a higher yield of infants with grades IV and V reflux. Studies of renal scarring suggest that waiting for the second UTI is acceptable and does not offset the benefit of sparing 90% of febrile infants with UTI the radiation, discomfort and cost of VCUG.

The revised guideline also includes a section identifying eight areas for research to inform subsequent revisions. An algorithm based on the guideline is provided along with an extensive technical report.



Dr. Roberts is lead author of the clinical practice guideline. He is chair of the AAP Subcommittee on Urinary Tract Infection, Steering Committee on Quality Improvement and Management.

UTI Clinical Practice Guideline algorithm



1. Risk of urinary tract infection (UTI) is ~5%.
2. A clinician may decide that a febrile infant requires antimicrobial therapy to be administered because of ill appearance or other pressing reason.
3. A urine sample suitable for culture should be obtained before initiating antimicrobials.
4. See text and tables below for girls and boys.
5. A urinalysis helps interpret the results of the urine culture, distinguishing UTI from asymptomatic bacteruria.
6. Suprapubic aspiration (SPA) is not recommended unless necessary, because it produces more distress than catheterization.
7. UA that includes microscopy with a hemocytometer has higher sensitivity and specificity but may not be available.
8. Urine dipstick is slightly less sensitive, but satisfactory if microscopy not available. Positive leukocyte esterase (LE) or nitrites or microscopy positive for white blood cells (WBCs) or bacteria is a positive urinalysis.
9. If urinalysis is negative, UTI is unlikely (<0.3%)
10. Satisfactory culture is necessary to document a true UTI and to guide antimicrobial management. Only urine obtained by catheterization (or SPA) is suitable for culture.
11. Sensitivities vary by region and time. Base route on practical consideration, eg. unable to retain oral fluids.
12. Pure growth of $\geq 50,000$ CFUs/mL of a uropathogen and urinalysis demonstrating bacteruria or pyuria.
13. Antimicrobial sensitivities of isolated bacteria should be used to adjust antimicrobial choice.
14. Look for anatomic abnormalities that require further evaluation.
15. Follow-up in 1-2 d is important to ensure risk factors have not emerged that would increase UTI risk.
16. Discontinuation of antimicrobials assumes that urine culture was obtained before any antimicrobials were started. Unnecessary antimicrobials can contribute to antimicrobial resistance and may increase risk of UTI.
17. "Proven UTI" means a positive urine culture obtained by suprapubic tap or catheterization. RBUS indications for voiding cystourethrography (VCUG) should be judged by the clinician.
18. After a second UTI, the risk of grade IV-V vesicoureteral reflux (VUR), ie, hydronephrosis, is estimated to be 18%.
19. Evaluation ideally within 48 h. Early detection and treatment of febrile UTI may reduce the risk of renal scarring.

Source: September 2011, Pediatrics

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AAP News 2011;32;1

DOI: 10.1542/aapnews.2011329-1c

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