First Febrile Urinary Tract Infection – Imaging excerpt from AAP Guideline

GREAT 002

Date: March 8, 2012

Title: Imaging in pediatric patients with first time febrile urinary tract infection (UTI)

Purpose of GREAT

The purpose of this document is to highlight recent evidence-based recommendations for imaging in infants and young children with first urinary tract infections from the American Academy of Pediatrics (AAP) guideline: Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and chldren 2 to 24 months *(AAP 2011 [CCHMC 5a])*. Adoption of this evidence will guide practice change at the point of care.

CCHMC Clinical Question

P	*(Population)*	In febrile infants and children, 2 to 24 months of age, with first time UTI,
I	*(Intervention)*	does limiting performance of voiding cystourethrography (VCUG) to children with abnormal findings on renal and bladder ultrasonography (RBUS),
C	*(Comparison)*	versus routinely obtaining VCUG,
O	*(Outcome)*	decrease harm by decreasing unnecessary radiation exposure, unnecessary antimicrobial prophylaxis exposure, patient discomfort, and time investment by parent without undue risk of delaying possible identification and correction of high grade vesicoureteral reflux (VUR) not discovered on RBUS with a first time UTI?

Target Population

Inclusion: Febrile infants and children, 2 to 24 months of age with first time urinary tract infection
Exclusion: Infants and children known to have atypical urinary tract pathology, or history of prior UTI

Definition

Febrile is defined as a fever of $\geq 38^{o}C$

Recommendations

Summarized imaging recommendations from the American Academy of Pediatrics (AAP) Clinical Practice Guideline for the diagnosis and management of the initial UTI in febrile infants and chldren 2 to 24 months.
(See Tables: CCHMC Table of Evidence Levels; AAP Table of Evidence Strengths; Language and Definitions for Recommendation Strength)

1. **It is recommended that** febrile infants and children with first presentation of UTI undergo RBUS as first line imaging *(AAP 2011 [CCHMC 5a]; [AAP C])*.

   Note: The purpose of the RBUS is to detect anatomic abnormalities that require further evaluation, such as additional imaging or urologic consultation *(AAP 2011 [CCHMC 5a])*.

2. **It is recommended that** VCUG **NOT** be performed routinely in febrile infants and children with first presentation of UTI *(AAP 2011 [CCHMC 5a]; [AAP B])*.

   Note 1: A VCUG is indicated if the RBUS reveals hydronephrosis, scarring, or other findings that would suggest either high grade VUR or obstructive uropathy, as well as in other atypical or complex clinical circumstances *(AAP 2011 [CCHMC 5a])*.

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Note 2: Although a small number of cases with VUR with correctable abnormalities may be initially missed without the routine use of a VCUG, it is not likely to change clinical management after a first febrile UTI *(AAP 2011 [CCHMC 5a])*.

Note 3: The AAP's meta-analysis of antimicrobial prophylaxis studies demonstrated that antimicrobial prophylaxis was not effective in preventing recurrence of febrile UTI/pyelonephritis. If prophylaxis is not beneficial, then the rationale for performing VCUG routinely after an initial febrile UTI must be questioned *(AAP 2011 [CCHMC 5a])*.

3. **It is recommended that** if a febrile UTI recurs a VCUG be conducted *(AAP 2011 [CCHMC 5a]; [AAP X])*.

Discussion / Summary of Evidence related to the recommendation*(s)* from the AAP Clinical Practice Guideline

Obtaining an RBUS in this population of children with first time UTI will yield abnormal results in about 15% of cases, and 1% to 2% will have abnormalities that would lead to further evaluation (e.g., additional imaging, referral, or surgery). Between 2% and 3% of all RBUS will yield false-positive results, leading to potentially unnecessary and invasive evaluations. The seriousness of the potentially correctable abnormalities in 1% to 2%, coupled with the absence of physical harm, was judged sufficient for the benefits to out-weigh the harms but may merit a discussion with parents *(AAP 2011 [CCHMC 5a])*.

Deferring a VCUG with a first time UTI avoids radiation exposure, discomfort and unnecessary cost. The diagnosis of a small number of cases of VUR and correctable abnormalities may be delayed. However, there is not sufficient evidence to support use of prophylactic antibiotics to prevent recurrent UTI in patients with VUR. Hence, the identification of VUR in these patients is not likely to change clinical management after a first febrile UTI. The risks associated with radiation (plus the expense and discomfort of the procedure) for the vast majority of infants outweigh the risk of delaying the diagnosis of abnormalities until their second UTI *(AAP 2011 [CCHMC 5a])*.

Because VCUG is an uncomfortable procedure involving radiation exposure, shared decision making with parents' garnering their preferences or judgments in the decision to perform or defer a VCUG may prove helpful. In some cases, after a first time UTI, parents may prefer their child have the procedure, even if the chance of benefit is both small and uncertain. It is the judgment of the AAP Guideline committee that VCUG is indicated after the second UTI. The benefits of obtaining a VCUG after a second UTI are to identify infants or children with very high-grade reflux. Some parents may want to avoid VCUG, even after the second UTI. These preferences should be considered, because the benefit of identifying VUR is still in some doubt *(AAP 2011 [CCHMC 5a])*.

Implementation

Relevant CCHMC Evidence-Based Implementation Tools

Health Topics: Urinary Tract Infections in infants and children: what about testing?
http://www.cincinnatichildrens.org/health/u/uti/

Applicability

These imaging recommendations are for general pediatrics as summarized from the AAP guideline. For unusual cases or specialty focus, use of specialty derived guidelines may be warranted. For review of such guidelines, links are provided below in the Search Strategy section. Differences in clinical approaches between general practice and specialties may impact the implementation of recommendations.

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Outcome or Process Measures

Decrease the proportion of children 2-24 months of age hospitalized at Cincinnati Children's Hospital Medical Center (CCHMC) with first time UTI and documented normal renal ultrasound who have had a VCUG completed within 30 days of discharge from 100% to 5%.

Implementation

Implementation of this practice change occurred through the use of a rapid cycle implementation collaboration (RCIC). Flow of the clinical process was explored and a key driver diagram developed to guide the team. Tests of change were conducted to determine the success and need for improvement of implementation strategies until successful strategies were identified. The RCIC process is designed as a 120 day cycle of improvement. Once implementation has occurred monitoring for sustainment begins.

Supporting Information

Background / Purpose of Development

The purpose of this document is to adopt the updated AAP recommendation for imaging in infants and young children with first urinary tract infections within general pediatrics.

Issues to consider when reviewing the evidence:

1. Recommendations are adapted from the AAP Clinical Practice Guideline for the Diagnosis and Management of the Initial UTI in Febrile Infants and Children 2 to 24 Months – Imaging recommendations.
2. **A**ppraisal of **G**uidelines for **RE**search and **E**valuation II (AGREE II) was performed on The AAP guideline by three independent reviewers *(AGREE_NextStepsConsortium 2009 [5a])*. The appraisal summary is included for reader review *(see AGREE II Purpose Overview below).*
3. Detail of the complete care management of children with initial UTI in febrile infants and children 2 to 24 months may be accessed via the link below *(See Search Strategy section).*

AGREE II Appraisal Summary – AAP Guideline

1.Scope and Purpose	85%
2.Stakeholder Involvement	74%
3.Rigor of Development	99%
4.Clarity and Presentation	96%
5.Applicability	58%
6.Editorial Independence	100%

AGREE II Purpose Overview
The Appraisal of Guidelines for Research & Evaluation (AGREE) Instrument was developed to address the issue of variability in guideline quality. To that end, the AGREE instrument is a tool that assesses the methodological rigor and transparency in which a guideline is developed.

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Search Strategy

Search from 2007 to current performed in March, 2012:

1. **National Guideline Clearinghouse:** (www.ngc.gov)

   The initial electronic search for guidelines resulted in 18 nationally available guidelines for the treatment of adult and children presenting with UTI. Fourteen were eliminated as not related to this population or associated with known abnormalities or recurrent UTI or only adults. Four pediatric guidelines were found that related to this topic, however only one that was focused on general pediatric application in a population that equates to the population seen in the U.S. The links to the AAP, specialty, and European guidelines are provided below for review by specialists.

   American Academy of Pediatrics
   http://pediatrics.aappublications.org/content/128/3/595.full.pdf+html?sid=0e7d511a-bb58-4468-9ebf-efcd00b3e309

   American College of Radiology

   http://www.acr.org/Quality-Safety/Standards-Guidelines

   European Association of Urology
   http://www.uroweb.org/gls/pdf/21_Paediatric_Urology.pdf

   National Institute for Health and Clinical Excellence (NICE Guideline 54)
   http://www.nice.org.uk/nicemedia/live/11819/36032/36032.pdf

   Italian Society of Pediatric Nephrology
   http://onlinelibrary.wiley.com/doi/10.1111/j.1651-2227.2011.02549.x/pdf

2. **Medline/Ovid:**

1.	Urinary Tract Infections/or uti.mp	36943
2.	First.mp.	1298086
3.	Fever/or Bacterial Infections/or febrile.mp or Urinary Tract Infections	123685
4.	1 and 2 and 3	2025
5.	Limit 4 to (english language and humans and 'yr="2007 Current")	398
6.	5 to ("all infant (birth to 23 months)" or " infant (1 to 23 months)")	137
7.	Limit 6 to guideline	0

Reference List *(Evidence Level in [ ]; See Table of Evidence Levels)*

1. **AAP, A. A. O. P.: Urinary tract infection: cinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and chldren 2 to 24 months. . *National Guideline Clearinghouse: NGC:008737 1995 (Original April)*, 2011 *[CCHMC 5a]*☜.**
2. **AGREE_NextStepsConsortium: The AGREE II Instrument [Electronic version]. Retrieved November 10, 2010, from *http://www.agreetrust.org*, 2009, *[5a]*☜.**

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Conflicts of Interest were declared for each team member and:

☒ No financial conflicts of interest were found.
☒ No external funding was received for development of this recommendation.

Note: Full tables of the LEGEND evidence evaluation system are available in separate documents:

- Table of Evidence Levels of Individual Studies by Domain, Study Design, & Quality *(abbreviated table below)*
- Grading a Body of Evidence to Answer a Clinical Question
- Judging the Strength of a Recommendation *(abbreviated table below)*

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CCHMC Table of Evidence Levels *(see note above)*

Quality level	*Definition*
1a† or 1b†	Systematic review, meta-analysis, or meta-synthesis of multiple studies
2a or 2b	Best study design for domain
3a or 3b	Fair study design for domain
4a or 4b	Weak study design for domain
5a or 5b	General review, expert opinion, case report, consensus report, or guideline
5	Local Consensus

†a = good quality study; b = lesser quality study

AAP Table of Evidence Strengths

Evidence Quality	Preponderance of Benefit or Harm	Balance of Benefit and Harm
A. Well designed RCTs or diagnostic studies on relevant population	Strong Recommendation	Option
B. RCTs or diagnostic studies with minor limitations;overwhelmingly consistent evidence from observational studies	Recommendation	
C. Observational studies (case-control and cohort design)		
D. Expert opinion, case reports, reasoning from first principles	Option	No Rec
X. Exceptional situations where validating studies cannot be performed and there is a clear preponderance of benefit or harm	Strong Recommendation / Recommendation	

Table of Language and Definitions for Recommendation Strength *(see note above)*

Language for Strength	*Definition*
It is strongly recommended that… It is strongly recommended that… not…	When the dimensions for judging the strength of the evidence are applied, there is high support that benefits clearly outweigh risks and burdens. *(or visa-versa for negative recommendations)*
It is recommended that… It is recommended that… not…	When the dimensions for judging the strength of the evidence are applied, there is moderate support that benefits are closely balanced with risks and burdens.
There is insufficient evidence and a lack of consensus to make a recommendation…	

Given the dimensions below and that more answers to the left of the scales indicate support for a stronger recommendation, the recommendation statement above reflects the strength of the recommendation as judged by the development group.
(Note that for negative recommendations, the left/right logic may be reversed for one or more dimensions.)

1. Grade of the Body of Evidence	☐ High	☒ Moderate	☐ Low
Comments:			
2. Safety / Harm (Side Effects and Risks)	☒ Minimal	☐ Moderate	☐ Serious
Comments: small risk of missed uropathy with first UTI			
3. Health benefit to patient	☐ Significant	☒ Moderate	☐ Minimal
Comments: less radiation exposure and less discomfort			
4. Burden on patient to adhere to recommendation	☒ Low	☐ Unable to determine	☐ High
Comments: less time investment, less cost			
5. Cost-effectiveness to healthcare system	☒ Cost-effective	☐ Inconclusive	☐ Not cost-effective
Comments: decrease in imaging procedures			
6. Directness of the evidence for this target population	☒ Directly relates	☐ Some concern of directness	☐ Indirectly relates
Comments:			
7. Impact on morbidity/mortality or quality of life	☐ High	☒ Medium	☐ Low
Comments: results in less testing at time of first UTI			

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Copies of this Evidence Recommendation Excerpt and related tools (if applicable, e.g., screening tools, algorithms, etc.) are available online and may be distributed by any organization for the global purpose of improving child health outcomes.
Website address: http://www.cincinnatichildrens.org/svc/alpha/h/health-policy/best.htm
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Please cite as: Cincinnati Children's Hospital Medical Center: Evidence Guideline Excerpt Recommendation ,First Febrile UTI Imaging Recommendations, http://www.cincinnatichildrens.org/svc/alpha/h/health-policy/best.htm, number 2, pages 1-5, May 18, 2012.

This Evidence Recommendation Excerpt has been reviewed against quality criteria by two independent reviewers from the CCHMC Evidence Collaboration. Conflict of interest declaration forms are filed with the CCHMC Evidence-Based Decision Making (EBDM) group.

For more information about CCHMC Guideline Evidence Recommendation Excerpts and the development process, contact the Evidence Collaboration at EBDMinfo@cchmc.org.

Note

This Evidence Recommendation Excerpt addresses only key points of care for the target population; it is not intended to be a comprehensive practice guideline. These recommendations result from review of literature and practices current at the time of their formulation. This Evidence Statement does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the recommendations to meet the specific and unique requirements of individual patients. Adherence to this Statement is voluntary. The clinician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.

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