

Antibiotic Stewardship and the Diagnosis of UTI in Children With Neurogenic Bladders

It is with great interest that we read the article by Forster et al,¹ entitled “Uropathogens and Pyuria in Children With Neurogenic Bladders.” Children with neurogenic bladders are at increased risk of urinary tract infection (UTI) secondary to a variety of factors, including altered immunity, poor bladder function, anatomic abnormalities, and clean intermittent catheterization (CIC). The diagnosis of UTI in children with neurogenic bladder is challenging because of bladder microbial colonization, altered sensation, concurrent bladder inflammation, and a failure of the medical community to accurately define UTI in this population.² Therefore, we respectfully disagree with the conclusion that in the “symptomatic child at risk for UTI, urine culture should be performed irrespective of the results of the urinalysis.” This conclusion is drawn despite the authors’ acknowledgment that, “[I]mitations of our study include our inability to differentiate between UTI and asymptomatic bacteriuria.”

Members of this research team previously found that urinalysis has a negative predictive value for UTI of 90.4% of children requiring CIC.³ In their current study, they demonstrate that *Enterococcus* in the urine may not be associated with pyuria; in their previous study, 4 patients without UTIs had *Enterococcus* detected in urine culture (3.6%), whereas none of the 22 patients with UTIs had *Enterococcus* detected. Additionally, in previous work, Schlager et al⁴ demonstrated that 80% of asymptomatic children with neurogenic bladder have bacteriuria and pyuria, and in many cases, these children remained asymptomatic and did not progress to a symptomatic UTI in the absence of antibiotic therapy. Most importantly, Ottolini et al⁵ followed children for

neurogenic bladder over a decade and found that asymptomatic bacteriuria in these children was not associated with renal scarring; therefore, antibiotic therapy is not required. Children with bladder dysfunction and recent exposure to antibiotics are significantly more likely to have pathogen resistance to 1 or more narrow-spectrum antimicrobials,⁶ and an increase in multidrug-resistant organisms has been reported in children undergoing CIC over the past decade. Detection and treatment of asymptomatic bacteriuria, therefore, adds little or no benefit but may add significant risk from antibiotic exposure.

We agree that researchers should focus on identifying biomarkers to properly diagnose UTI in this population and defining parameters for antibiotic therapy. Although the diagnosis of UTI in this population remains challenging, it is imperative that we avoid unnecessary antibiotic exposure and preserve therapy for children at risk for pyelonephritis, renal scarring, and urosepsis. This requires careful evaluation of symptoms and interpretation of urine testing results. Acknowledging uncertainty due to imperfect diagnostic tools, clinicians should attempt to distinguish UTI from asymptomatic bacteriuria. Urinalysis is a valuable tool in this regard, and algorithms that require a positive urinalysis result before a urine culture is obtained may prevent unnecessary treatment of asymptomatic bacteriuria. Otherwise, we will be obligated to treat bacteriuria in the absence of UTI, thus increasing antibiotic exposure in a population already at high risk for resistant infections.

Annabelle de St. Maurice, MD, MPH
Pediatric Infectious Disease Physician, Mattel
Children’s Hospital, University of California,
Los Angeles
E-mail: adestmaurice@mednet.ucla.edu

Zachary Willis, MD, MPH
Pediatric Infectious Disease Physician, University
of North Carolina at Chapel Hill School of
Medicine

Sherry Ross, MD
Pediatric Urology, University of North Carolina at
Chapel Hill School of Medicine

CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

REFERENCES

1. Forster CS, Shaikh N, Hoberman A, Jackson E. Uropathogens and pyuria in children with neurogenic bladders. *Pediatrics*. 2018; 141(5):e20173006
2. Madden-Fuentes RJ, McNamara ER, Lloyd JC, et al. Variation in definitions of urinary tract infections in spina bifida patients: a systematic review. *Pediatrics*. 2013;132(1): 132–139
3. Forster CS, Haslam DB, Jackson E, Goldstein SL. Utility of a routine urinalysis in children who require clean intermittent catheterization. *J Pediatr Urol*. 2017;13(5): 488.e1–488.e5
4. Schlager TA, Dilks S, Trudell J, Whittam TS, Hendley JO. Bacteriuria in children with neurogenic bladder treated with intermittent catheterization: natural history. *J Pediatr*. 1995;126(3):490–496
5. Ottolini MC, Shaer CM, Rushton HG, Majd M, Gonzales EC, Patel KM. Relationship of asymptomatic bacteriuria and renal scarring in children with neuropathic bladders who are practicing clean intermittent catheterization. *J Pediatr*. 1995; 127(3):368–372
6. Shaikh N, Hoberman A, Keren R, et al. Predictors of antimicrobial resistance among pathogens causing urinary tract infection in children. *J Pediatr*. 2016;171:116–121

doi:10.1542/peds.2018-1481A

Authors’ Response

We appreciate the comments made by de St Maurice et al, regarding our work on the association between pyuria and *Enterococcus*. We agree with their stated concern regarding both overdiagnosis and overtreatment of bacteriuria in asymptomatic children. However, as stated in our conclusion, we were focused on the interpretation of urinalysis in symptomatic children.

Distinguishing UTI from urinary tract colonization is currently challenging given the lack of specific markers to differentiate these 2 conditions. Thus, clinicians rely on the child’s symptoms

Antibiotic Stewardship and the Diagnosis of UTI in Children With Neurogenic Bladders

Annabelle de St. Maurice, Zachary Willis and Sherry Ross

Pediatrics 2018;142;

DOI: 10.1542/peds.2018-1481A originally published online July 31, 2018;

Updated Information & Services	including high resolution figures, can be found at: http://pediatrics.aappublications.org/content/142/2/e20181481A
References	This article cites 6 articles, 2 of which you can access for free at: http://pediatrics.aappublications.org/content/142/2/e20181481A#BIBL
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): Urology http://www.aappublications.org/cgi/collection/urology_sub Genitourinary Disorders http://www.aappublications.org/cgi/collection/genitourinary_disorders_sub
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: http://www.aappublications.org/site/misc/Permissions.xhtml
Reprints	Information about ordering reprints can be found online: http://www.aappublications.org/site/misc/reprints.xhtml

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Antibiotic Stewardship and the Diagnosis of UTI in Children With Neurogenic Bladders

Annabelle de St. Maurice, Zachary Willis and Sherry Ross

Pediatrics 2018;142;

DOI: 10.1542/peds.2018-1481A originally published online July 31, 2018;

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/142/2/e20181481A>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 345 Park Avenue, Itasca, Illinois, 60143. Copyright © 2018 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 1073-0397.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN®

