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, "[l]imitations 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 al[4] 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 al[5] 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.

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

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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

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Pediatrics 2018;142;
DOI: 10.1542/peds.2018-1481A originally published online July 31, 2018;

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