

Re: Two-Step Process for ED UTI Screening

Urinary tract infections (UTIs) represent a significant cause of serious bacterial infection in the pediatric population. Recently there has been much discussion surrounding the screening and diagnosis of UTIs. The American Academy of Pediatrics 2011 guidelines¹ recommend suprapubic aspiration or catheterization in patients who cannot spontaneously void. Lavelle et al² recently proposed a 2-step approach for the diagnosis of UTIs to reduce the number of catheterizations due to their invasiveness. The study suggests initially screening for leukocyte esterase and nitrates with a bagged sample before catheterization for culture.

However, a negative nitrite has little value in ruling out UTIs.¹ Similarly, the sensitivity of leukocyte esterase has been cited as ~79%,³ which is far from perfect for a screening test. In addition, a recent study by Shaikh et al⁴ found that children with UTIs caused by certain uropathogens other than *Escherichia coli* were less likely to have a positive leukocyte esterase test.

Because of the relatively low sensitivity of the dipstick test, a urine culture would not have been performed on many children with a true UTI. The fact that patients did not follow-up at The Children's Hospital of Philadelphia network facilities with persistent symptoms is not convincing evidence that UTIs were not missed; children could have presented to out-of-network practices or symptoms may have resolved spontaneously. Accordingly, based on the well-established low sensitivity of the leukocyte esterase and nitrite tests, we fear the 2-step method proposed by Lavelle et al² may result in more missed cases of UTI. Therefore, to allow us to perform both a bedside test (either dipstick or urinalysis) and a urine culture, in our practices, we will continue to perform catheterizations in young children in whom we suspect UTI.

Elaine L. Chiang
Pediatric Resident, Children's Hospital of
Pittsburgh of UPMC, Pittsburgh, Pennsylvania
E-mail: elaine.chiang@chp.edu

Nader Shaikh
Associate Professor of Pediatrics, Children's
Hospital of Pittsburgh of UPMC, Pittsburgh,
Pennsylvania

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Authors' Response

Drs Chiang and Shaikh are correct in stating that the urine dipstick or urinalysis does not have perfect sensitivity for detecting all urinary tract infections (UTIs) in young children.¹ As in many cases in medicine, the clinician must weigh the risks and benefits of testing and also rely on good discharge instructions and follow-up.

To account for asymptomatic bacteriuria, the American Academy of Pediatrics guidelines define a UTI as a positive culture in the presence of pyuria.² Many are concerned, however, about pyelonephritis in young infants because they may lack signs of inflammation in the urine,³ perhaps due to the pathogen

itself⁴ or to diluted urine that does not remain in the bladder for long in young infants. For this reason, we use the 2 stage process beginning at 6 months and do urethral catheterization with culture for all febrile infants <2 months and for those 2 to 6 months who have risk factors for UTI.

Based on our preimplementation data, we chose to define a positive result as moderate or large leukocyte esterase (LE) or nitrite in a bagged specimen, which necessitates subsequent urethral catheterization to obtain a urine culture. Before the implementation of the 2-step process, we routinely did urine catheterizations on all febrile infants meeting risk criteria. If the point-of-care urine dipstick was negative (includes trace or small LE), the positive predictive value (PPV) or prevalence of positive culture in our population (based only on a colony count of >50 000 colony forming units per milliliter with a uropathogen) was 1.5% (95% confidence interval, 1.25%–1.8%). For those with an entirely negative result (no trace or small LE), the PPV was 0.8% (95% confidence interval, 0.5%–1.0%). This is compared with a PPV of 60.5% in infants with a positive dipstick as we define it in our 2-step process (moderate or large LE or positive nitrite). Of course, PPV varies by prevalence of disease in a population. If one wants to be even more sensitive, then choosing trace or small LE would result in more urethral catheterizations, but an even smaller chance of delay in diagnosis.

Although we could not follow patients outside our health system, ~38% to 40% of our emergency department population is followed within our primary care network. We also routinely provide discharge instructions indicating that if a fever persists, follow-up with a primary care provider is indicated. At that time, their provider may elect to do urethral catheterization to evaluate for UTI. To date, we have had no reports of delayed diagnosis of UTI.

We hope this helps you and others to make a decision about when to implement the 2-step process with follow-up versus going directly to urethral catheterization. We all need to have a rational approach to detecting UTIs.⁵ We agree that it is important not to miss UTI as a cause of fever in infants and young children.

Kathy N. Shaw
*Pediatric Emergency Medicine Attending,
Children's Hospital of Philadelphia,
Philadelphia, Pennsylvania*
E-mail: shaw@email.chop.edu

Mercedes M. Blackstone
*Pediatric Emergency Medicine Attending,
Children's Hospital of Philadelphia,
Philadelphia, Pennsylvania*

Jane M. Lavelle
*Pediatric Emergency Medicine Attending,
Children's Hospital of Philadelphia,
Philadelphia, Pennsylvania*

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