Impact of Urine Analysis Methods in the Diagnosis of Uncomplicated Urinary Tract Infection

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ABSTRACT

BACKGROUND: Acute urinary tract infection (UTI) results in 33.5 million office or emergency room visits and 21 million prescriptions in the United States annually. Non-culture methods, including detection of pyuria and bacteria by dipstick and microscopy, are commonly used to inform clinicians whether to prescribe empiric antibiotics. Urine dipstick is readily available in the outpatient setting, but the performance characteristics of the leucocyte esterase (LE) and nitrite (N) tests, alone or in combination, vary. In general, two tests used together perform better than either test used alone, and the tests are better at detecting bacteria at high colony counts than at low colony counts. Other factors may impact the performance characteristics of the LE and N tests, including whether the strip is read by visual inspection or by machine.

METHODS: As part of an open label study of oral ciprofloxacin in adult women with uUTI at 20 U.S. sites, we analyzed the performance characteristic for LE and N, focusing on whether strips were read by visual inspection or by machine. All patients enrolled had at least two of five classic uUTI symptoms and a positive urine dip stick for both LE and N. Post-enrollment, prior to treatment, patient’s urine was collected and sent to the local laboratory for culture and sensitivity. Initially, sites followed their laboratory for culture examination of the urine, including detection of pyuria and bacteriuria by dipstick and/or microscopy. All patients were provided an automated dipstick reader (McKesson Consult® 120 Urine Analyzer) which was employed for the remainder of the study.

RESULTS:

As part of an open label study of oral ciprofloxacin in adult women with uUTI at 20 U.S. sites, we analyzed the performance characteristic for LE and N, focusing on whether strips were read by visual inspection or by machine. All patients enrolled had at least two of five classic uUTI symptoms and a positive urine dip stick for both LE and N. Post-enrollment, prior to treatment, patient’s urine was collected and sent to the local laboratory for culture and sensitivity. Initially, sites followed their standard of care and read the dipsticks either visually or with an automated reader. Pathway through the study, sites were provided an automated dipstick analyzer machine (McKesson Consult® 120 Urine Analyzer) which was employed for the remainder of the study.

CONCLUSIONS: Visual inspection of urine dipsticks is a subjective process that may lead to misinterpretation of results. Use of an automated urine dipstick reader to identify specimens positive for both LE and N showed an improved culture positivity rate over those identified as positive by visual inspection. There is a need for more accurate methods to identify patients with uUTI.

INTRODUCTION

Acute urinary tract infection (UTI) results in 33.5 million office or emergency room visits and 21 million prescriptions in the United States annually. The presence of classic UTI symptoms and routine culture examination of the urine, including detection of pyuria and bacteria by dipstick and/or microscopy, are commonly used to inform clinicians whether to prescribe empiric antibiotics. Urine dipstick is the most common non-culture test utilized by clinicians. It is readily available in the outpatient setting, but the performance characteristics of the leucocyte esterase (LE) and nitrite (N) tests, alone or in combination, vary. In general, two tests used together perform better than either test used alone, and the tests are better at detecting bacteria at high colony counts than at low colony counts. Other factors may impact the performance characteristics of the LE and N tests, including whether the strip is read by visual inspection or by machine.

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