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Use of a Leukocyte Esterase Dipstick to Detect *Chlamydia trachomatis* and *Neisseria gonorrhoeae* Urethritis in Asymptomatic Adolescent Male Detainees

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Abstract: We tested 91 asymptomatic adolescent male detainees in a short-stay detention facility in Seattle, Washington for the presence of leukocyte esterase in first-catch urine and for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* infection. *C. trachomatis* was isolated from 10 subjects (11 per cent) and *N. gonorrhoeae* from five (5 per cent). Dipsticks detected leukocyte esterase in the urine of all 15 subjects with either infection and of 13 subjects with neither infection. Detection of leukocyte esterase was 100 per cent sensitive, 83 per cent specific, and 54 per cent predictive for the presence of either organism. (*Am J Public Health* 1988; 78:1583-1584.)

Introduction

Reported prevalences of asymptomatic infections with *Chlamydia trachomatis* and *Neisseria gonorrhoeae* in asymptomatic adolescent males are as high as 26 per cent¹

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and 2 per cent,² respectively. For lack of a simple, inexpensive, and atraumatic method, such males usually are not tested for these infections. Microscopic analysis of first-catch urine for pyuria is an alternative to swabbing the urethra.^{3,4} While such analysis is sensitive and specific for detecting urethritis, it requires a centrifuge and microscope and is time-consuming.

The leukocyte esterase dipstick test is a non-invasive, fast, inexpensive procedure for detecting pyuria.⁵ It has been used to detect *C. trachomatis* and *N. gonorrhoeae* in populations mainly comprised of symptomatic males in venereology or medical clinics.^{4,6,7} We used dipsticks to detect infection in asymptomatic males in a short-stay juvenile detention center.

Methods

We studied asymptomatic adolescent males in the King County juvenile detention center in Seattle, Washington. We sought consent for testing from available asymptomatic males who were ≥ 14 years old, had taken no antimicrobials within the previous 30 days, and had coitus within the previous year or with more than one sexual partner during their lifetimes. Potential subjects were requested to come to the medical clinic and did not initiate the visits themselves. They were excluded from this analysis if they had symptoms of urethritis when questioned. Each subject was asked to submit a first-catch aliquot of urine, which was collected

without respect to the most recent micturition. Two thin wire-stemmed calcium alginate swabs (Pur-Wrap urethro-genital swab, Hardwood Products, Guilford, Maine) were then introduced into the subject's urethra.

Urine was tested for leukocyte esterase with either a Chemstrip LN (BioDynamics, Indianapolis, Indiana) or Multistix (Ames Division, Miles Laboratories, Elkhart, Indiana) dipstick. Positive reactions were those with more than a "trace" reaction.

One swab from the urethra was used for isolation of *C. trachomatis*,⁸ and the other for isolation of *N. gonorrhoeae*,⁹ as was a cotton swab dipped in the urine.

Statistical analysis was done with Fisher's exact test or the Chi-square test for proportions. Exact confidence intervals (CI) were calculated with an HP67 calculator.¹⁰

The study was approved by the institutional review boards of the University of Washington and the King County Department of Youth Services.

Results

Of 114 eligible subjects, consent and specimens were obtained from 91 (80 per cent) who were from 14.2 to 18.3 years (median = 16.8) years old. The most recent coitus was from two days to two years prior to examination (median = 70 days).

C. trachomatis was isolated from 10 subjects (11 per cent) and *N. gonorrhoeae* from five (5 per cent). None were infected with both organisms. *C. trachomatis* was isolated from eight of 39 Black subjects, one of 44 White subjects, and one of eight subjects of other ethnicity (Hispanic, Native American, Asian).

Leukocyte esterase was detected in the urine of all 15 subjects infected with either organism and of 13 with neither infection. The presence of leukocyte esterase was perfectly sensitive (95% CI=78%-100%) and 83% specific (95% CI=78%-91%) and 54% predictive (95% CI=34%-72%) for the presence of either organism. Isolation of *N. gonorrhoeae* from urine and urethral swabs correlated perfectly.

Discussion

Detection of leukocyte esterase with a dipstick was a sensitive and moderately specific indicator of asymptomatic *C. trachomatis* or *N. gonorrhoeae* infection of the urethra in asymptomatic adolescent males. The test is simple, fast, and costs only about \$0.20. Although not perfectly sensitive for the detection of *C. trachomatis* or *N. gonorrhoeae* in all reports to date, the ease and accuracy of the test make it suitable for screening of asymptomatic males in clinical and other settings, such as detention centers.

The 450,000 males who are detained each year in short-stay facilities¹¹ pose a special problem in screening for sexually transmitted diseases. At the minimum, detection of leukocyte esterase should lead to further testing for *C. trachomatis* and *N. gonorrhoeae*. These tests are often not available, and it is difficult to ensure that detainees will seek medical care after being released. Presumptive treatment of urethritis based on the presence of leukocyte esterase may be indicated in this situation.¹²

Some "false positive" dipstick reactions may be true positives because urethral cultures for *C. trachomatis*¹³ and

*N. gonorrhoeae*¹⁴ may be <90 per cent sensitive. Also, urethritis may be caused by organisms such as *Ureaplasma urealyticum* and *Trichomonas vaginalis*, for which we did not test. As many as 30 per cent of cases of nongonococcal urethritis may be of undetermined etiology.^{15,16} A sensitive assay may detect subclinical urethritis, but we do not yet know its etiologic spectrum.

Cultures for *N. gonorrhoeae* made by dipping swabs in unspun urine correlated perfectly with urethral cultures, in agreement with previous reports.^{14,17} When leukocyte esterase is detected and confirmation of *C. trachomatis* or *N. gonorrhoeae* infection is sought, the latter can be detected by culturing urine.

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