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Chlamydia trachomatis antigen can be detected in the urine sample of men with non-gonococcal urethritis

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Summary. We tested the first portion of voided urine (FVU) and urethral swab from 80 patients with non-gonococcal urethritis (NGU) using a novel enzyme-amplified immunoassay (IDEIA) for the detection of *Chlamydia trachomatis* antigen. Urine specimens were positive in all patients with positive urethral swabs (positive coincidence ratio, 100%) and in 6 of 54 patients with negative swabs (negative coincidence ratio, 88.9%). Our data suggest that FVU is suitable for the detection of *Chlamydia trachomatis* antigen using the IDEIA test in patients with NGU.

Key words: *Chlamydia trachomatis* – First portion of voided urine – Non-gonococcal urethritis – Enzyme-amplified immunoassay

Chlamydia trachomatis has been proven to be the major etiological agent in male non-gonococcal urethritis (NGU). Because *C. trachomatis* is an obligatory intracellular parasite, its detection in men with urethritis has long been known to require swabbing of the endourethra for infected urethral epithelial cells rather than the collection of urine specimens or discharge. However, the former is an invasive and cumbersome procedure for epidemiologic studies of asymptomatic chlamydia infection in men. Caul et al. [1] and Paul and Caul [3] have recently reported that the early morning urine sample is suitable for the demonstration of *C. trachomatis* antigen using a direct immunofluorescent antibody technique (DFA) or an enzyme-amplified immunoassay (IDEA). The aim of the present study was to detect *C. trachomatis* antigen in the first portion of voided urine (FVU) using the IDEIA test in men with NGU.

Patients and methods

Patients

In the present study we evaluated specimens from 80 men with NGU who were seen in our hospitals. No patient had previously received antibiotics for treatment of urethritis.

Sampling procedure

FVU and a urethral swab were collected from each patient. Approximately 10 ml FVU was collected in a sterile container before the urethral swabbing was performed. The urine specimen was centrifuged at 2,000 *g* for 15 min and the sediment was then suspended in 1 ml enzyme immunoassay (EIA) transport medium, stored at −20°C and processed within 7 days. We swabbed urethra of each patient by inserting the swab 2–4 cm into the urethra, then rotating and withdrawing it. The swab was placed in 1 ml EIA transport medium, stored at −20°C and processed within 7 days.

EIA method

The IDEIA test (Novo Biolabs Ltd, Cambridge, UK) was used to detect *Chlamydia trachomatis* antigen in both the urine sediment and the urethral swab. In this test, *C. trachomatis* antigen is detected by a genus-specific monoclonal antibody used in an amplified enzyme immunoassay [4]. The assay was carried out according to the recommendations of the manufacturer.

Results

Chlamydia trachomatis antigen was detected in 40% (32/80) of the urine specimens and in 32.5% (26/80) of the urethral swabs (Table 1).

Urine specimens were positive in all patients with positive urethral swabs (positive coincidence ratio, 100%) and in 6 of 54 patients with negative swabs (negative coincidence ratio, 88.9%). The overall correlation of detection of *C. trachomatis* antigen in the urine with that in the urethral swab was 92.5% (74/80; Table 2).

Discussion

Chlamydia trachomatis is generally considered to be the most common sexually transmitted pathogen and is associated with NGU, acute epididymitis, cervicitis, and pelvic inflammatory disease. The diagnosis of chlamydia

Table 1. Detection of *Chlamydia trachomatis* antigen in men with NGU

Sample	Number tested	*C. trachomatis*-positive
FVU	80	32 (40%)
Urethral swab	80	26 (32.5%)

FVU; First portion of voided urine

Table 2. Comparison of FVU versus urethral swab for the detection of *Clamydia trachomatis* antigen in men with NGU

Urethral swab results	FVU results		
	Positive	Negative	Total
Positive	26 (100%)	0	26
Negative	6	48 (88.9%)	54
Total	32	48	80

FVU, First portion of voided urine

infection is based on the ability to culture the organism on HeLa 229 or McCoy cells or the detection of *C. trachomatis* antigen using techniques such as DFA or EIA. Because this organism is an obligatory intracellular parasite, its detection in men with urethritis has long been known to require sampling of infected urethral epithelial cells rather than the collection of urine or discharge. Smith and Weed [6] reported that only urethral swabs were adequate specimens, as 70% of the positive swab cultures were missed in cultures of urine samples. Urine can be highly toxic to the culture cells. Recent studies have demonstrated that an early morning FVU is suitable for the detection of *C. trachomatis* antigen using DFA or IDEIA [1, 3].

In the present study, we compared the detection of *C. trachomatis* antigen in FVU with that in urethral swabs from patients with NGU using the IDEIA test. In this assay, the antigen is detected by a genus-specific monoclonal antibody used in an amplified enzyme immunoassay [4]. The IDEIA assay has been reported to be suitable for the diagnosis of *C. trachomatis* infection because of its good correlation with cell culture [4]. The detection rate obtained in urine sediments (40%) was similar both to that in urethral swabs (32%) in the present study and to that found in other studies in which the detection of *C. trachomatis* was performed by a sensitive cell culture using urethral swabs [2, 5, 7].

In the present study, urine specimens were positive in all patients with positive swabs (positive coincidence ratio, 100%) and in 6 of 54 patients with negative swabs (negative coincidence ratio, 88.9%). In conclusion, our data suggest that FVU can be used conveniently and non-invasively to diagnose *C. trachomatis* urethritis in symptomatic men.

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