Original Article

Urogenital *chlamydia trachomatis* infection among prisoner men

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Abstract

Objectives: *Chlamydia trachomatis* (*C.trachomatis*) is one of the most common curable STDs. Little information is available on its incidence among prisoner men. This study aimed to investigate the frequency of urogenital infection with *C.trachomatis* among imprisoned men as a high risk group.

Patients and Methods: In this cross-sectional study, 130 imprisoned men aged 16-49 years in one of Tehran prisons were randomly selected. After completing informed consent, each volunteer dedicated a urine sampler and a completed questionnaire. DNA extraction and PCR assay were performed in Avicenna Research Institute.

Results: Among the 130 prisoner men, only 3 (2.3%) had positive PCR test results.

Mean age of participants was 28.00 ±4.58 and the mean age at first sexual contact was 20.33 ±3.51. All had at least elementary education while 66.7% were unmarried and 33.3% were unemployed and had less than 1000000 Rails per month. Moreover, 33.3% were homeless and others living in rental houses. Furthermore, 66.6% had more than 4 sexual partners. There was no difference in condom use and none of them mentioned urinary discharge or dysuria. Additionally, 66.6% were IVDU and had more than 3 prison admissions. There was no report of HIV, HCV or HBV infection among them.

Conclusion: The low incidence of *C.trachomatis* in this study showed that screening of asymptomatic men by PCR is not cost-effective and in order to obtain more epidemiological information, low-cost techniques such as serological methods can be recommended. Moreover, studies with broader distribution and higher sample size should be performed to determine real prevalence of chlamydia infection and make a definite decision about screening.

Keywords: Chlamydia trachomatis, Prisoners, male, Polymerase Chain Reaction, Urogenital Diseases.

Introduction

Chlamydia trachomatis (CT) is the most common etiological agent of sexually transmitted diseases (STDs) after Herpes simplex Virus (HSV) and Human papilloma Virus (HPV) (1). World Health Organization (WHO) estimates that 90 million cases of chlamydia infections occur worldwide annually (2) and according to Centers for Disease Control and Prevention (CDC) reports, about 4 million new cases develop each year (3) that are often asymptomatic (4). Untreated chlamydia infection in men may lead to urethritis, proctitis, epididymitis and epididymo-orchitis (5) and infected men are able to transmit the bacteria to their sex partners. In women, however, chlamydia infection can cause Pelvic Inflammatory Disease (PID), tubal infertility, ectopic pregnancy and chronic pelvic pain (3).

Epidemiology of CT infection among young women has been studied well, e.g., the prevalence of chlamydia infection by PCR-based testing of urine samples from women attending obstetric and gynecology clinics in Tehran was 12.3% (6). However, little information is available on its incidence among asymptomatic sexually active men (3). For example, two surveys have been studied Iranian men and Japanese students by PCR on urine samples and the incidence of CT have been obtained 0.7% and 8.3%, respectively (7,8). In addition, study numbers on prevalence of CT infection among asymptomatic imprisoned men, known as a bridge group in STI, are far fewer than of asymptomatic sexually active men. The infection rate in the Netherlands among 21000 prisoners aged 15-29 years was 2% (9) and in California, 9.9% of imprisoned men aged 18-25 years had positive urine test (10). Furthermore, in the United States, 98296 adolescents in rehabilitation centers were studied and 5.9% of them were found to be infected with CT (11).

Studies in Iran have focused on prevalence of CT infection in patients (12) which of prisoners are especially important because they would distribute the infection in the society, as number of multipartners is very high in this group.

Apart from that, valuable laboratory methods such as cytological techniques (identification of inclusion bodies), cell culture, antigen detection tests using Enzyme-Linked Immunosorbent Assay (ELISA) and Direct Fluorescent Antibody (DFA), direct nucleic acid hybridization and amplification methods are recommended for diagnosing CT (13) and Nucleic Acid Amplification Tests (NAATs) are suggested for detection of CT in urine specimens.

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NAATs have also been proposed as a method of screening for STD caused by CT in developing countries (14). Comparison of diagnostic value of PCR and Ligase Chain Reaction (LCR) with the culture method as a gold standard, demonstrated that PCR and LCR are more sensitive than culture and the specificity of molecular assays is similar to the standard method (3).

Identifying the epidemiological status of CT at different levels of society, factors predisposing to infection and screening programs may help to reduce the infection in the community. Therefore, this study aimed to investigate the prevalence of urogenital infection with CT among imprisoned men as high risk group.

Patients and Methods

Study subjects: In 2006, a population of 130 men aged 16-49 years (reproductive age) in prison were randomly selected and enrolled in this cross-sectional study after signing a written informed consent, evaluated and proved by Avicenna Ethical Committee. Participants who had no consumption of antibiotic during the 3 weeks before sampling and had not passed urine in the 2 past hours met the inclusion criteria.

A questionnaire form consisted of personal and reproductive histories such as age, education status, occupation, present income, home location, marital status, age at marriage, number of children, age at first sexual intercourse, number of sex partners, condom use, drug abuse, duration of imprisonment, number of imprisonment(s), some chlamydia-related diseases and etc. were completed by an interviewer who was assistant in infectious diseases and tropical medicine.

About 30-50 ml of first void urine specimen was collected in sterile container. Questionnaires and specimen containers were coded and urine samples transported at 2-8 °C to the Avicenna research institute daily.

DNA extraction and PCR: DNA was extracted by the method of Sambrook and Russell (15). Extracted DNA samples were stored at -20 °C and the tests were done during the following 7 days. 5 µl of extracted DNA was added to the master mix which consisted of 5 µl 10× buffer (without $MgCl_2$) (Roche, Germany), 25 mM of $MgCl_2$ (Roche, Germany), 0.4 mM dNTPs, 0.4 µM of each primer, 1 U of Taq DNA polymerase (Roche, Germany), and distilled H_2O to a total volume of 25 µl. The nucleotide sequences of primers were S: 5´GGA CAA ATC GTA TCT CGG 3´ and AS: 5´GAA ACC AAC TCT ACG CTG 3´ (16).

The amplification reactions were carried out using a Thermocycler (Eppendorf, Germany). A pre- PCR step at 94 °C for 5 min was applied and a total number of 40 cycles were run under the following conditions: denaturation at 94 °C for 30 s, annealing at 55 °C for 30 s and extension at 72 °C for 30 s. The length of the amplified product is 517 bp (fig. 1).

The PCR procedure was repeated for 45 cycles for all negative samples.

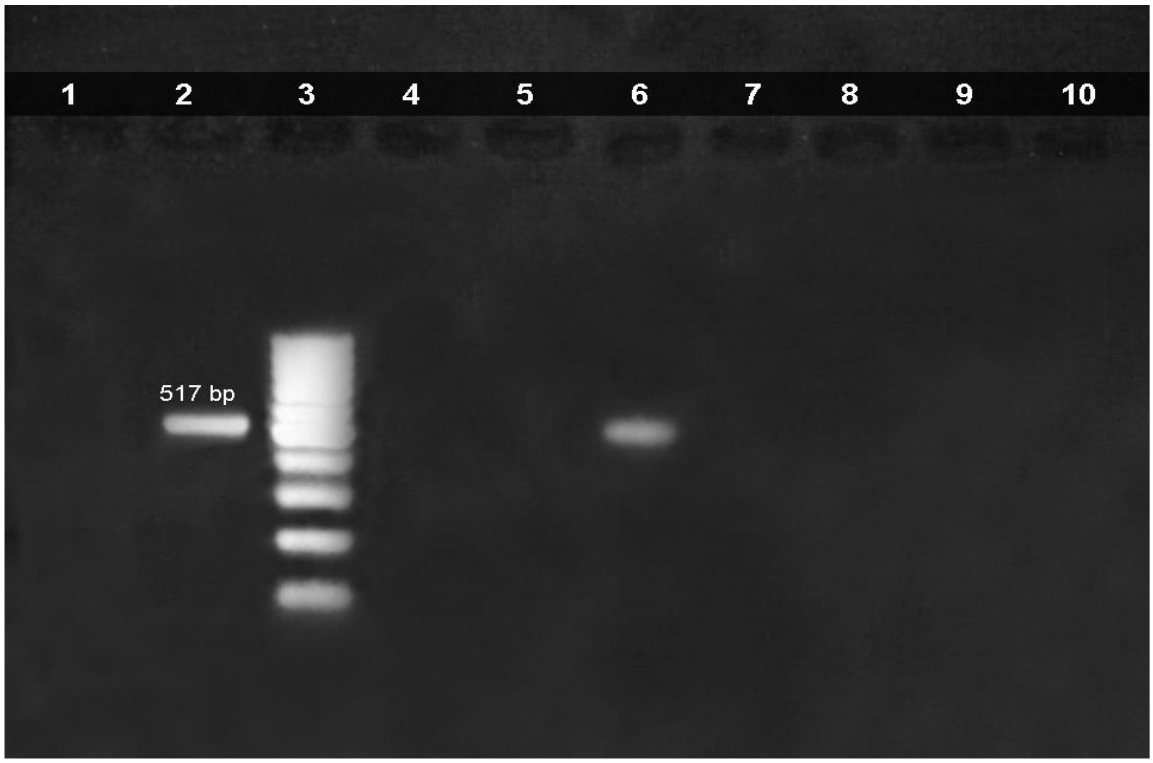

Figure 1. Agarose gel electrophoresis analysis of PCR products. Lane 1: Negative control. Lane 2: Positive control. Lane 3: 100 bp DNA ladder. Lanes 4, 5, 7, 8, 9 and 10: Negative tests. Lane 6: Positive test.

Results

The imprisoned men participating in this study were 16-49 years old (mean age± Standard deviation (SD): 29.46± 6.81). The age at marriage ranged between 15-32 years (mean age± SD: 23.29± 3.44) and the mean age at first sexual contact was 18.79± 3.86 years (mean age± SD: 10-32).

Regarding the questionnaire data, 91.5% of participants were literate and only 2 persons had university education. Additionally, 54.6% of participants were married or had history of marriage, 60.0% had no child, 91.5% were employed, 31.7% had a monthly income below 1,000,000 Rials, 8.5% were homeless, 49.6% had more than one sex partner, 56.2% never used condom, and 49.6% 6 and 46.4%, respectively, had symptoms of discharge and dysuria. Moreover, 96.9% were drug abusers, 69.5% were imprisoned more than once and 88.8% had no history of hepatitis B, hepatitis C and HIV/AIDS.

Among the 130 prisoner men, only 3 (2.3%) had positive PCR test results whose mean age and mean age at first sexual contact were 28.00 ±4.58 and 20.33 ±3.51, respectively. Furthermore, all had at least elementary education, 66.7% were unmarried, 33.3% were unemployed, 33.3% were homeless and others were living in rental homes and 66.6% had more than 4 sexual partners. There was no difference in condom use and none of them mentioned about urinary discharge or dysuria. Moreover, 66.6% were Intravenous drug user (IVDU) and had more than 3 prison admissions and last but not least, there was no report of HIV, HCV or HBV infection among them.

Discussion

Chlamydia trachomatis (CT) is one of the most common curable STDs (17) and about 70-80% of infected women (18) and 50% of men have no symptoms (19). Little information is available on incidence of CT in asymptomatic sexually active men (3). Due to lack of information about prevalence of chlamydia infection among this population, planning a screening program seems to be impossible. Therefore, this study examined prisoner men by PCR on urine samples in this high risk group.

The prevalence of CT in Iran and neighboring countries has been studied in healthy people and symptomatic patients, however, the survey of infection rate in prisoners has been neglected. Most of studies on prisoner groups have been conducted in the United States of which infection rate varies in different studies, e.g. 9.9% of 18-25-year-old prisoners in California (10), 5.9% of boys in 14 U.S. prisons (11), 8.1% of prisoner boys in rehabilitation center (20) and 3% of young prisoners in Canada (21), were infected with CT.

In our study, CT was identified in 3 out of 130 (2.3%) urine specimens of prisoner men. The discrepancy in prevalence of chlamydia infection between current study and previous investigations may be caused by differences in culture, religious commitment such as avoiding sex outside marriage, different sample size and diagnostic methods.

Low sample size and method of data collection limited this study. Despite the cooperation of prison staffs in sample collection, statistics of total prisoners was not available to researchers and random sampling was carried out using encrypted list of prisoners. The participants' data were obtained from their statements without access to medical records that could have resulted in incomplete reports. However, all participants were interviewed by a qualified interviewer and questionnaires were completed with confidentiality and privacy to provide an acceptable accuracy.

According to previous studies, screening program will be cost-effective if the prevalence of CT among men and women is at least 6% (22). The incidence of CT in this study was 2.3%; therefore, screening of asymptomatic men by PCR is not affordable and in order to obtain more epidemiological information, low-cost techniques such as serological methods can be recommended. Moreover, studies with broader distribution and larger sample size should be performed to determine real prevalence of chlamydia infection and make a definite decision about screening. Concurrent studies in other communities at risk and patients with clinical syndromes such as infertility, epididymitis, urethritis and prostatitis will be helpful to find national statistics.

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Conflict of interest

None declared.

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