

ENDOCERVICAL CHLAMYDIAL INFECTION IN WOMEN ATTENDING A SEXUALLY TRANSMITTED DISEASE CLINIC IN SINGAPORE

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ABSTRACT

Two hundred women attending the sexually transmitted disease (STD) clinic at Middle Road Hospital were investigated. *Chlamydia trachomatis* was isolated from 32% of women who were contacts of men with nongonococcal urethritis, 15% of contacts of gonococcal urethritis, 27% of contacts of unspecified STD, and 13% of women without any history of STD in their sex partners. Overall, *Chlamydia trachomatis* was isolated from 17% of 200 women, *Neisseria gonorrhoeae* from 13% of 199 women, *Candida albicans* from 34% and *Trichomonas vaginalis* from 6% of 197 women. Three per cent of the patients had positive VDRL results. A history of bilateral lower abdominal pain and the presence of cervicitis were significantly associated with chlamydial infection. Forty one per cent of the 34 chlamydia-positive women were asymptomatic.

The results of this study show that *C. trachomatis* infection is more common than infection with *N. gonorrhoeae* in women who attend STD clinics. The need for routine screening and treatment on the basis of epidemiological and clinical markers of infection has to be carefully examined.

Key Words: *Chlamydia trachomatis*, sexually transmitted disease, infections in women

— SING MED J. 1989; No 30: 167 — 169

INTRODUCTION

Chlamydia trachomatis is an important sexually transmitted pathogen linked etiologically to urethritis and epididymitis in men and cervicitis and pelvic inflammatory disease (PID) in women. It is also a cause of conjunctivitis and pneumonia in infants (1). Since women infected with *C. trachomatis* are often asymptomatic, they form a very important reservoir for the agent, transmitting infection to their sexual partners and newborn, whilst themselves are at risk of developing complications such as PID. To appropriately manage chlamydial infections, physicians must

have information regarding the prevalence of infection in different subpopulations of patients. Several studies conducted in western countries have documented that 12 — 33% of women attending sexually transmitted disease (STD) clinics harbour chlamydiae in their cervixes (2 — 9). A study conducted in this institution showed that 39% of female contacts of nongonococcal urethritis (NGU) were chlamydia-positive (10). However, the prevalence of *C. trachomatis* infections among women attending a STD clinic here has not been previously determined. This study was therefore, conducted to determine this.

MATERIALS AND METHODS

The patients selected were women attending the STD clinic in Middle Road Hospital, Singapore between October 1984 and December 1987 for the first time or who were reporting with a new complaint. Women who had taken antibiotics during the preceding two weeks were excluded. The patients selected for the study were classified into four groups according to the STD contact history:

- Group A — women contact of men with NGU
- Group B — women contact of men with gonococcal urethritis
- Group C — women contact of men with unspecified STD
- Group D — women without a history of contact with STD

A history was taken with particular attention to genitourinary symptoms and a clinical examination was made for the presence of cervicitis and PID. Cervicitis was diagnosed clinically on the presence of cervical friability (as judged by bleeding on initial swabbing) and/or mucopurulent exudate from the os. Cervical erosions by themselves were not considered to indicate cervicitis unless also accompanied by a mucopurulent discharge or friability. PID was diagnosed clinically on the basis of three minimum criteria of (a) cervicitis, (b) history of bilateral abdominal pain and (c) tenderness on palpation of the cervix or adnexae.

Urethral and endocervical specimens were taken for Gram-stained microscopy for the presence of Gram-negative intracellular diplococci. Specimens from the endocervix were also directly inoculated into modified

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Thayer-Martin medium for gonococcal culture. Endocervical swabs for the culture of *C. trachomatis* were inoculated into 2SP transport medium and transported to the laboratory in ice within 6 hours of collection. Chlamydia *trachomatis* was cultured in cycloheximide treated McCoy cell monolayers. Details of the method of culture and identification of Chlamydia *trachomatis* and *N. gonorrhoeae* have been described previously (10). Vaginal specimens were also taken for Gram-stained microscopy for budding yeasts and pseudohyphae and for wet-film microscopy for motile trichomonads. *Candida albicans* and *Trichomonas vaginalis* were cultured in Trichosel broth (BBL, USA) supplemented with 8% horse serum. The Veneral Disease Reference Laboratory (VDRL) test was performed on all the patients. Positive VDRL blood was confirmed with the Treponema Haemagglutination (TPHA) test (Fujirebio, Tokyo).

Statistical analysis of the data was performed using the Student's T-test, chi-square test with Yate's correction, and the Fisher's exact probability test, where appropriate.

RESULTS

Altogether 200 women were investigated. The demographic and epidemiological characteristics of these patients are shown in Table I.

TABLE I
DEMOGRAPHIC AND EPIDEMIOLOGICAL
CHARACTERISTICS OF 200 WOMEN
STD CLINIC ATTENDERS

Characteristic	Value
Age range	15 – 49 years
Mean Age	28.2 ± 7.7
Race:	
Chinese	81.5%
Malay	13.5%
Indians/Others	5.0%
Marital status:	
Married	70.1%
Divorced/separated	2.4%
Single	27.6%
Occupation:	
Housewife	44.4%
Skilled and semiskilled workers	39.9%
Unskilled workers	6.1%
Student	3.5%
Unemployed	6.1%
Professional/managerial	—
Last sexual partner:	
Husband	71.7%
Regular boyfriend	25.9%
Casual	2.4%
Type of contact:	
NGU (Group A)	15.5%
GU (Group B)	13.5%
Unspecified STD (Group C)	7.5%
GU symptoms but no history of STD in sexual partner (Group D)	63.5%

The isolation of *C. trachomatis* and *N. gonorrhoeae* from the four study groups are shown in Table II. The highest isolation rate for *C. trachomatis* was found in women who were contacts of men with NGU (32%), followed by women who were contacts of unspecified STD (27%), women who were contacts of men with GU (15%), and other women (13%). Overall, the isolation of *C. trachomatis* in women attending the STD clinic at Middle Road Hospital was 17% (34/200), and for *Neisseria gonorrhoeae* it was 13% (26/199). *Candida albicans* was isola-

ted from 34% (66/197) and *Trichomonas vaginalis* from 6% (12/197). Nineteen per cent (5/26) of the women with gonorrhoea were chlamydia-positive. Syphilis was detected in 3% of the patients.

TABLE II
CHLAMYDIAL AND GONOCOCCAL ISOLATION

Study group	<i>C. trachomatis</i> infected/total (%)	<i>N. gonorrhoeae</i> infected/total (%)	*
A	10/31 (32)	0/31 (0)	
B	4/27 (15)	14/27 (52)	
C	4/15 (27)	0/15 (0)	
D	16/127 (13)	12/126 (10)	

Of the 34 chlamydia-positive women, 14 (41%) were asymptomatic. The mean age of chlamydia-positive and chlamydia-negative women were 26.5 years and 28.5 years, respectively. Three (60%) of 5 patients with bilateral lower abdominal pain were chlamydia-positive as compared with 28 (15%) of 185 women without this symptom ($p = 0.03$). Twenty-six (28%) of 93 women with cervicitis were chlamydia-positive compared with six (6%) of 99 women without cervicitis (p less than 0.05). Only one patient had PID and she was chlamydia-positive. There was no significant association between chlamydial infection and race, occupation, marital status, relationship with the last sexual partner, genitourinary symptoms other than bilateral lower abdominal pain, and clinical signs other than cervicitis.

DISCUSSION

The overall isolation rate of *C. trachomatis* was 17% compared to 13% for *N. gonorrhoeae*. Three per cent of the women examined showed positive treponemal serology; this is rather high because some of the women examined were contacts of men with confirmed syphilis. In the West *C. trachomatis* was isolated from 12 – 33% of women attending STD clinics (2 – 9). Like several studies in the West, chlamydia seems to be more common than gonorrhoea among women attending STD clinics (2, 4 – 8). In this study, chlamydiae was most commonly isolated from women who were contacts of men with NGU (32%). This is somewhat lower than the 39% isolation rate we documented in another study of 85 female contacts of men with NGU (10). The isolation rate from women who were contacts of men with gonorrhoea was 15% and in women with gonorrhoea, it was 19%. Studies conducted in the west have documented higher chlamydial co-infection rates of 25 – 63% of women with gonorrhoea (2 – 4, 11, 12). Interestingly, 27% of the women who were contacts of unspecified STDs were chlamydia-positive. Additionally 13% of women reporting for STD examination who were not aware of any STD in their sexual partners were also chlamydia-positive. This group of patients consisted mainly of women who were suspicious of STD because of symptoms or promiscuity in their sexual partners. This study therefore indicates that women attending the STD clinic because of suspicion about STD are at high risk for chlamydial infection. Whether they are contacts of STD in their partners or whether they are attending merely out of concern because of symptoms or promiscuity in their sexual partners does not matter.

The high prevalence rates of infection in the four groups of patients studied indicate a need for screening tests for chlamydial infection and where this is not possible, for selective treatment based on epidemiological and

clinical markers of infection. Additionally, fifty per cent of the chlamydia-positive women were married and of child-bearing age (mean age of 28.5 years). This further emphasizes the importance of treatment.

In Singapore, we are also seeing an increase in the incidence of non specific genital infections over the last five years (unpublished data). NSGI is now the second most common STD. The incidence of gonorrhoea, on the other hand is on the decline. If this trend continues, NSGI will overtake the incidence of gonorrhoea, a situation that western countries now face. To avoid an epidemic of chlamydial infections and the secondary epidemics of PID, infertility and ectopic pregnancies, Singapore must develop its own chlamydial control program. Newer me-

thods of diagnosing chlamydial infections based on direct immunofluorescence (13) and enzyme linked immunosorbent assays (14) compare favourably with conventional tissue culture isolation, and can be made widely available to clinics. Introduction of these new methods will encourage screening and this will have a considerable impact on the prevalence of chlamydial infection in the community.

ACKNOWLEDGEMENT

We would like to thank our colleagues, the nurses at Middle Road Hospital and the staff of the Department of Pathology, Outram Road, for their help in conducting this study.

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