

Cervical Chlamydia trachomatis Infection Related Mucopurulent Cervicitis (MPC) among Commercial Sex Workers Attending a Private Sexually Transmitted Diseases (STD) Clinic

Verapol Chandeying MD,*
Jintana Pradutkanchana MSc,*
Roengsak Leetanaporn MD,*
Piyarat Sinpisut MSc.*

* Faculty of Medicine, Prince of Songkla University, Songkla 90112, Thailand

ABSTRACT

Objective To study the prevalence of cervical Chlamydia trachomatis infection among masseuses who are female commercial sex workers (CSWs), and the association between C. trachomatis and mucopurulent cervicitis (MPC).

Design Cross-sectional study.

Setting A private Sexually Transmitted Clinic (STD) affiliated with Hat Yai STD unit.

Subjects The study group was 125 masseuses work at a modern massage parlor in Hat Yai who regularly visited the clinic to have routine check-up for common STD every week.

Main outcome measures Chlamydial isolation, and PMN criteria of endocervical smear stain.

Results The prevalence of cervical C. trachomatis infection is 12 in 125 cases (9.6%). Most (11 in 12 cases) of cervical C. trachomatis infection (91.6%) had no abnormal vaginal discharge (AVD). Half (6 in 12 cases) of cervical C. trachomatis infection had associated with MPC. According to the PMN criteria of 10 or more, cervical C. trachomatis infection were found 6 in 91 cases (6.5%) of non-MPC, and 6 in 38 cases (17.6%) of MPC. In comparison with the PMN criteria of 30 or more, cervical C. trachomatis infection were found 7 in 87 cases (8.0%) of non-MPC, and 5 in 38 cases (13.2%) of MPC. There were no statistical difference ($P > 0.5$) between two different PMN criteria and cervical C. trachomatis infection or MPC.

Conclusion The AVD is only suggestive information, but PMN criteria either ≥ 10 or ≥ 30 is found to be confirmative diagnosis of MPC, but no difference is associated with positive C. trachomatis.

Key words : chlamydial infection, mucopurulent cervicitis, commercial sex workers

Chlamydia trachomatis is among the most prevalent sexually transmitted diseases (STD) and has been shown to be an important cause of mucopurulent cervicitis (MPC), urethritis and salpingitis in women.⁽¹⁻⁴⁾ Moreover, it has been shown to be associated with infertility in women,⁽¹⁻⁵⁾ and with complications of pregnancy, such as premature rupture of membrane, premature delivery and post-partum endometritis and it is probably the most common causative agent of ophthalmia neonatorum and accounts for many pneumonias in infant.^(1-3,6-9) *C. trachomatis* can be recovered from the cervix in 5 to 35% of sexually active women, depending on the characteristic of the population.^(1,10-13) Infection of the cervix is the most common genital infection in women and approximately 50% of these infections are asymptomatic or cause mild or non-specific symptoms and signs. MPC is seen with both *N. gonorrhoeae* and *C. trachomatis* with the latter accounting for 60% of cases.⁽⁴⁾

In addition to vaginal discharge, the patient may present with history of postcoital vaginal spotting. On examination, ectopy or eversion of the squamo-columnar junctions is frequently observed and these findings are associated with greater number of inclusions. The cervix is friable, bleeds easily with placement of speculum or sampling of glandular epithelium.⁽¹⁴⁻¹⁶⁾ The term MPC thus can be broadly defined as indicating the presence of endocervical PMN leukocyte exudate, as manifested either by visible mucopurulent (the colour should be noted in comparison with the white colour of the swab, whereas the characteristic of the endocervical secretion was categorized into clear, cloudy, and mucopurulent), or by the presence of ≥ 10 PMN leukocytes per X 1,000 field when examine at least 5 separate areas on a smear-stained specimen of endocervical mucus which has been

properly collected to avoid contamination with vaginal cells.⁽⁴⁾ We proposed another PMN criteria by the presence of ≥ 30 PMN leukocytes per X 1,000 field when examine at least one separate area on a smear-stained.

The fact that many chlamydial infections elude clinical diagnosis has directly contributed to their increasing incidence and public health importance.⁽¹⁷⁾ We undertook the present study among masseuses work at a modern massage parlor in Hat Yai who regularly visit a private STD clinic to have routine check-up of common STD every week for identification the prevalence of cervical *C. trachomatis* by using culture method, and their association with MPC.

Materials and Methods

Patient population : The study population consisted of 125 consecutive masseuses attending a private STD clinic affiliated with Hat Yai STD who regularly visit the clinic to have routine check-up for common STD every week in January 1995. The sex workers were excluded as those who had taken antibiotics within the previous two weeks, or positive gonococcal isolation.

Clinical and microscopic evaluation : Each patient was interviewed concerning clinical and sexual history. Information was obtained on patient age, marital status, condom use for prevention of STD, history of AVD, current contraception practices, and exposure to antibiotics in the previous two weeks.

After the ectocervix was wiped clean with a large cotton swab, endocervical mucus was collected on a white-tipped swab, with care taken to avoid contamination by the vaginal secretions. The endocervical culture for *C. trachomatis* was performed with the use of a cotton-tipped plastic swab which was immediately placed in sucrose-phosphate transport medium on wet ice.

Subsequent to the culturing, another swab was rolled onto a 1 - 2 square centimetres area on a microscopic slide. The smear was heat dry and stained with methylene blue.

Oil was added, and slide was scanned at a magnification of 100 to evaluate the presence and amount of endocervical mucus, to look for squamous cells, and to identify area of mucus that appear to contain inflammatory cell. Most often, polymorphonuclear neutrophil (PMN) leukocytes were distributed uniformly in endocervical mucus, but in cases which they were distributed in a patchy fashion, representative areas containing the densest concentration of such leukocytes were selected. The number of PMN leukocytes per microscopic field at a magnification of 1,000 in 5 nonadjacent fields was then established with use of oil lens.

The presence of ≥ 10 PMN leukocytes per X 1,000 field in mucus supports the diagnosis of MPC, unless heavy contamination by vaginal epithelial cells (e.g. > 100 squamous cells per slide) and vaginal flora (e.g. > 100 bacteria per X 1,000 field overlying endocervical mucus) suggest that the PMN leukocytes may have origin in the vagina rather than in the endocervix. The presence of ≥ 30 PMN leukocytes per X 1,000 field at least one area in the smear also diagnosed as MPC. The demonstration of intracellular diplococci at least three pairs or more is strongly suggestive for gonorrhea.

Laboratory methods : Specimens for isolation of *C. trachomatis* were stored in the sucrose-phosphate transport media (0.2M) at -70°C before inoculation onto cycloheximide-treated McCoy cells in shell vial. Growth of *C. trachomatis* was detected with fluorescein-labeled monoclonal antibody (IMAGENTM Chlamydia ; DAKO Diagnostic Ltd., Denmark) at 48 hours after incubation.

Results

The mean age of the 125 masseuses was 25.10 ± 6.16 years, the range varies from 18 - 45, and about two-third (65.6%) were nulliparous. The most predominant method of contraception was pills (88.8%), followed by DMPA (8.0%).

Nearly all (124 in 125 cases) of them (99.2%) used condoms every time when they had sexual intercourse with the clients in order to prevent STD. Among these, 12 in 125 cases (9.6%) were culture positive for *C. trachomatis* and diagnosed as cervical *C. trachomatis* infection. Half (6 in 12 cases) of cervical *C. trachomatis* infection (50.0%) had associated with mucopurulent cervicitis (MPC). There was only one woman who used condoms occasionally, and her endocervical culture was negative for *C. trachomatis*. With regard to AVD, 115 in 125 cases (92.0%) had no abnormal vaginal discharge. The characteristic of endocervical secretion was determined ; 6 in 125 cases (4.8%) were mucopurulent discharge (all were *C. trachomatis* negative), 8 in 125 cases (6.4%) were cloudy (only one case was *C. trachomatis* positive), and 111 in 125 (88.8%) were clear (11 cases were *C. trachomatis* positive).

Most (11 in 12 cases) of cervical *C. trachomatis* infection (91.6%) had no AVD. There were no statistical difference ($P = 0.649$) between the abnormal vaginal and cervical *C. trachomatis* infection. The visible mucopus did not relate with cervical *C. trachomatis* infection.

Table 1 shows the correlation between cervical *C. trachomatis* infection and MPC. According to the PMN criteria (10 or more) for clinical diagnosis, MPC were found 34 in 125 cases (27.2%). Among these, 6 in 34 cases (17.6%) were MPC with chlamydiae-positive form, and 28 in 34 cases (82.4%) were MPC with

chlamydiae-negative form. Cervical C. trachomatis infection were found 6 in 91 cases (6.5%) of non-MPC, whereas 6 in 34 cases (17.6%) of MPC in the group of PMN criteria of 10 or more ($P = 0.127$).

In comparison with the PMN criteria (30 or more), MPC were found 38 in 125 cases (30.4%). Among these, 5 in 38 cases (13.2%) were MPC with chlamydiae-positive form, and 33 in 38 cases (86.8%) were MPC with chlamydiae-negative form. Cervical C. trachomatis infection were found 7 in 87 cases (8.0%) of non-MPC, whereas 5 in 38 cases (13.2%) of MPC in the group of PMN criteria of 30 or more ($P = 0.573$).

Most of MPC are chlamydiae-negative form. Among the two PMN criteria, there were no statistical difference ($P > 0.5$) between each PMN criteria and cervical C. trachomatis infection or MPC.

Discussion

Cervical C. trachomatis infection in women is important not only because most of the infected women are asymptomatic but also because the consequences can be serious. Among women

with urogenital chlamydial infection, an estimated 10% can result in acute salpingitis. The reported prevalence of genital infection varies from 5 to 35% depending on the study population. In this study the prevalence of C. trachomatis infection is rather low compared to other studies even though the study population is a high risk group. In comparison, our unpublished data showed the prevalence of C. trachomatis among pregnant women about 5%. This can be explained by the high rate of condom usage among the masseuses who are influenced by the widespread campaign for prevention of HIV. It is generally known that contraceptive methods have significant impact on the acquisition of the sexually transmitted pathogen. Barrier methods are highly effective in preventing the transmission of bacteria and virus during sexual intercourse.

The AVD and the characteristic of the endocervical discharge are not related to the culture positive of chlamydiae neither does the number of PMN in the endocervical gram stain. This study showed no statistical difference between each PMN criteria (10 or more, and 30 or more) and cervical C. trachomatis infection or

Table 1. Correlation between cervical C. trachomatis infection and MPC

	No. of patient(%) N = 125	Culture positive for Chlamydiae (%)	P value
Endocervical secretion			
mucopurulent	6 (4.8)	-	
cloudy	8 (6.4)	1/8 (12.5)	
clear	111 (88.8)	11/111 (9.9)	
PMN criteria of 10 or more			
PMN < 10	91 (72.8)	6/91 (6.5)	
PMN \geq 10	34 (27.2)	6/34 (17.6)	0.127
PMN criteria of 30 or more			
PMN < 30	87 (69.6)	7/87 (8.0)	
PMN \geq 30	38 (30.4)	5/38 (13.2)	0.573

MPC. Thus, we suggested that the term of visible mucopus will be used to refer to yellow endocervical discharge, and the term of microscopic mucopus will be used to refer to the presence of ≥ 10 PMN leukocytes per $\times 1,000$ field when examine at least 5 separate area or the presence of ≥ 30 PMN leukocytes per $\times 1,000$ field when examine at least one separate area on a stained smear.

In general practice, the women who have the symptoms of AVD, and found to get along with the PMN criteria of confirmation (either ≥ 10 or ≥ 30) should be diagnosed as MPC. The treatment then should be prescribed according to whether it is chlamydiae-positive or chlamydiae-negative form.⁽¹⁸⁾ The characteristic colour of endocervical discharge is not associated with number of PMN found in stained smear nor is it associated with chlamydial infection. So, the clinical diagnosis of MPC can not depend on the mucopurulent endocervical secretion or PMN criteria alone. More strong and alternative criteria of MPC can be referred to the combination between visible mucopus and microscopic mucopus as the clinical diagnosis.

References

1. Schachter J. Chlamydial infection. *N Engl J Med* 1978 ; 428-35, 490-5, 540-9.
2. Holmes KK. The Chlamydia epidemic. *JAMA* 1981 ; 245 : 1718-23.
3. Sweet RL, Schachter J, Landers DV. Chlamydial infection in Obstetrics and Gynecology. *Clin Obstet Gynecol* 1983 ; 26 : 143-64.
4. Brunham RC, Paavonen J, Stevens CE. Mucopurulent cervicitis : the ignored counterpart of urethritis in men. *N Engl Med* 1984 ; 311 : 1-6.
5. Svensson L, Mardh PA, Westrom L. Infertility after acute salpingitis with special reference to Chlamydia trachomatis. *Fertil Steril* 1983 ; 40 : 322-9.
6. Sweet RL, Landers DV, Walker C. Chlamydia trachomatis infection and pregnancy outcome. *Am J Obstet Gynecol* 1987 ; 156 : 824.
7. Harrison HR, English MG, Lee CK, Alexander ER. Chlamydia trachomatis infant pneumonitis : comparison with matched controls and other infant pneumonitis. *N Engl J Med* 1978 ; 298 : 702-8.
8. Armstrong JH, Zacarias F, Rein MF. Ophthalmia neonatorum : a chart review. *Pediatrics* 1976 ; 57 : 884-92.
9. Rees E, Tait IA, Hobson D. Neonatal conjunctivitis caused by *Neisseria gonorrhoeae* and Chlamydia trachomatis. *Br J Vener Dis* 1977 ; 53 : 173-9.
10. Johannsson G, Lowhagen GB, Lycke E. Genital Chlamydia trachomatis infection in women. *Obstet Gynecol* 1980 ; 56 : 671-5.
11. Stamm WE, Holmes KK. Chlamydia trachomatis infections of the adult. In : Holmes KK, Mardh PA, Sparling PF, editors. *Sexually transmitted diseases*. 2 nd ed. McGraw-Hill, New York, 1990 : 181-93.
12. Stamm WE, Holmes KK. Chlamydial infections : What should we do while waiting for a diagnostic test. *West J Med* 1981 ; 135 : 226-9.
13. Harrison HR, Costin M, Meder JB. Cervical C. trachomatis infection in university women : relationship to history, contraception, ectopy and cervicitis. *Am J Obstet Gynecol* 1985 ; 153 : 244-51.
14. Saltz GR, Linnemann CC, Brookman RR, Rauh JL. Chlamydia trachomatis cervical infections in female adolescent. *J Pediatr* 1981 ; 98 : 981-5.
15. Fraser GL, Rettig PG, Kaplan DW. Prevalence of Chlamydia trachomatis and *Neisseria gonorrhoeae* in female adolescents. *Pediatrics* 1983 : 71 : 333.
16. Paavonen J, Vesterinen E, Meyer B, Saksela E. Colposcopic and histologic findings in cervical chlamydial infection. *Obstet Gynecol* 1982 ; 59 : 712-5.
17. Handsfield HH, Stamm WE, Holmes KK. Public health implication and control of sexually transmitted chlamydial infections. *Sex Transm Dis* 1981 ; 8 : 85-6.
18. Chandeying V, Sutthijumroon S, Tungphaisal S. Evaluation of ofloxacin in the treatment of mucopurulent cervicitis : response of chlamydia-positive and chlamydia-negative forms. *J Med Assoc Thai* 1989 ; 72 : 331-7.