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Detecting chlamydial infection in women

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Abstract:

Chlamydia trachomatis infections are the most common bacterial cause of sexually transmitted disease in the world. In women, these infections often result in such serious reproductive tract complications as pelvic inflamatory disease, infertility, and ectopic pregnancy and an infected woman can pass the infection to her newborn during delivery. The diagnosis of C Trachomatis infections has historically been difficult, but newer chlamydia diagnostic tests have become clinically available in the past decade.

Key Words:

Chlamydia trachomatis, Infectıon, Cell culture, Pelvic inflammatory disease, Ligase chain reaction, Polymerase chain reaction, Epidemiology.

Introduction

Chlamydia trachomatis infections are the most common bacterial cause of sexually transmitted disease (STD) in the world (1). In women, these infections often result in serious reproductive tract complication, such as pelvic inflamotory disease (PID), infertility, and ectopic pregnancy (2). In addition, an infected pregnant women can pass the infection to her newborn during delivery, resulting in such problems as ophtalmia neonatorum,which appears as conjunctivitis 5 to 12 days after birth. C trachomatis is also a common cause of subacute, afebrile pneumonia in newborn (3,10).

A large number of published studies have examined the prevalence and characteristics of chlamydial infections, mostly among sexually active women attending clinics for family planning, prenatal care, the diagnosis and treatment of STD (4,12). Regardless of the region of the country or the population density, the prevalence and risk factor are similar.The highest prevalence has been reported among sexually active adolescent females 17 years of age and younger in USA (4,17,18,19). More than 105 of sexually active young women tested in various clinics have been found to have chlamydial infections, a level significantly high enough that routinely testing for chlamydia suggested (5,6,7).

A high number of sexual partner and concurrent gonorrhea infection are commonly associated with chlamydial infection. In fact , patients with gonococcal infection are so commonly coinfected with C trachomatis that treatment advised if no diagnostic test for chlamydia will be performed(7,8). While there is no consistent evidence that oral contraceptives raise the risk of chlamydial infection, the data clearly indicate that barrier contraception protects against chlamydial infection (8,13).

Approximately 70% of chlamydial infections and 50% of gonococcal infections in women are asyptomatic. Asymptomatic carriage of chlamydia in men as well as in women may be prolonged,often persisting for months. Little is known about the efficiency of sexual transmission chlamydia , but it appears that chlamydia is more difficult to transmit than gonorrhea(9). In addition, chlamydial infections may facilitate human immunodeficiency virus transmission(10).

Clinical signs

Women if not adequately treated, develop pelvic inflammatory disease (PID). Scarring sequelae of PID will cause involuntary infertility in 20%, ectopic pregnancy in 9%, and chronic pelvic pain in 18% of women (11).

The endocervix is the most common site infected by C. trachomatis in women; however, the urethra and rectum may also be infected. Most cervical chlamydial infections do not cause sufficient inflamation to result in clinical signs (11,12). When symptoms do occur, they most commonly include vaginal discharge and /or dysuria(12). The presence of green or yellow mucopus on swab from within the cervical os or 10 or more polymorphonuclear leukocytes (PMNs) Per oil immersion field of Gram's stained cervical secretions is strongly associated with chlamydial

infection and termed “mucopurulent cervicitis”, the female equivalent of urethritis in men (13,22).Some experts reserve the diagnosis of mucoprulent cervicitis for finding of 30 or more PMNs per high-power field on a cervical Gram’s stain(13,14) . The ascension of lower genitourinary tract infection to the endometrium and fallopian tubes may cause lower abdominal pain and menstrual abnormalities. The proportion of with chlamydial infection who develop infection of the upper reproductive tract (including endometritis,salpingitis,and pelvic peritonitis) is unknown(14,15).

Pelvic inflammatory disease. The rate at which chlamydial organisms have been recovered from patients with symptoms of PID has varied widely, probably, because of differences in the populations being studied and in the methods used to recover the organisms. Investigators from Europe and North America have found a higher proportion of C trachomatis than Neisseria gonorrhoeae in women with microorganisms in 5 % to 51 % of women in the US treated for PID (7,15,16,17).

The clinical presentation of symptomatic chlamydial PID is essentially the same as that caused by other organisms, although it appears that symptoms may be milder than those caused by gonococcal PID. The major presenting complaint is lower abdominal pain that is usually constant but may be intermittent. Increased vaginal discharge or fever may or may not be present. Symptoms commonly begin at the time of menstruation (18).

The role of asymptomatic or subclinic chlamydial PID in the development of reproductive problems has assumed greater importance. Colonization of the fallopian tube by C trachomatis has been found in infertile women who have no clinical symptoms of PID and no laparoscopic signs of active pelvic infection. Ectopic pregnancy may result from prior chlamydial tubal damage(19).

Neonatal complication. Infection of neonates with C trachomatis results from perinatal exposure to the mother’s infected cervix. The prevalence of C trachomatis infection generally exceeds 5% among pregnant women, regardless of race/ethnicity or socioeconomic status. İnitial C trachomatis perinatal infection involves mucous membranes of the eye, oropharynx, urogenital tract, and rectum. Chlamydia is the most frequent identifiable cause of ophthalmia neonatorum and should be considered the probable etiology for conjunctivitis in all infants who develop conjonctivitis within the first 30 days of life (10,20).

C trachomatis is also a common cause of subacute, afebrile pneumonia with onset from 1 to 3 months of age. Cough with tachypnea, and hyperinflation and bilateral diffuse infiltrates on a chest roentgenogram is characteristic. Wheezing are are rare,and children are typically afebrile. Because variation from this clinical presentation is common, initial treatment and diagnostic tests should encompass C trachomatis for all infants 1 to 3 months of age who have possible pneumonia (4,21).

Laboratory diagnosis

Because chlamydiae are obligate intracellular organisms that infect columnar epitelium, the objective of good specimen collection should be to obtain columnar epithelial cells from the endocervix or uretra. The diagnosis of chlamydial STDs generally has been difficult and remains a challenge, but never chlamydia diagnostic tests have been clinically available in the past decade (11,14,22,23). Tissue culture remains the gold standart , yet its application in clinical settings ranging from university hospital to local family medicine office and public health clinics is limited by a lack of appropiate reference laboratories , technical expertise, funds or recognition of chlamydiae as important STD pahogens. The requirement of at least 3 to 7 days for optimal chlamydial growth diminishes cell culture clinical utility. Once the specimen is collected, it must be kept refrigerated for no longer than 24 hours before inoculation onto prested McCoy cells . The preferred method for detection of chlamydia in tissue culture is with a florescein- labeled antibody that is specific for C trachomatis and reacts with the inclusion body formed inside the cell. Since tissue culture amplifies small numbers of organisms are expected (19, 23). Antigen Detection. New nonculture diagnostic tests, each with their own utility and limitations, were introduced in the 1980s. The direct fluorescent antibody (DFA) test is based on detection of elementary bodies (EB) in patient specimens using a fluorescein - labeled monoclonal antibody that is specific for either the major outer membrane protein of C trachomatis or the lipopolysaccharide (LPS) moiety of the EB. A distinct advantage of DFA is that the quality of the specimen can be assesssed. Since it is applied to a slide, the direct visualization of epithelial cells in the specimen under fluorescent microscopy indicates an adequate specimen was obtained. Slides can be restored at 4°C for a few months or at -80°C indefinetely. The sensitivity, specificity, an positif predictive values for DFA have been assessed by comparison with culture. In high prevalence populations (>5%), sensitivity varies from 70% to 90% depending on the quality of the specimen collected, patients characteristics including age and STD risk factors , the tecnical reliability of the laboratory performing cultures. The specificity is from 96 %to 99 % in the same high prevalence populations (21,24,25). False negative and false positif results can occur but are more of a problem in low prevalence groups (<5%).

The enzyme immunoassay test (EIA) employs polyclonal or monoclonal antibodies that detect chlamydial LPS . The antibodies are conjugated with an enzyme that reacts with a substrate to produce a colored product if chlamydiae are present. A spectrophotometer is required to detect the intensity of the colored product. A major disadvantage of this assay is that the antibodies with the LPS of other bacterial species found in the vagina or urinary tract and may produce a fale positive result. This is also not species specific for C trachomatis. Most EIA tests contain a blocking antibody that can be used to confirm a positive test. The sensitivities, specificities, and positive predictive values for EIA are similar to those for DFA(14,25,26). Nucleic acid hybridization. Nucleic acid hybridization (probe) tests chemiluminescent type DNA probe that is complementary to a sequence of ribosomal RNA in the chlamydial genome of the patient sample. A distinct advantage of this assay is that it is specific for C trachomatis and does not cross react with other bacteria. Specimen can be stored at room temperature in special transport material and processed within 7 days. The sensitivity and specificity rates are similar to those for DFA, and EIA. The availability of nucleic acid amplification technologies may make non invasive urine testing avilable for

young men and for young women when a gynecologic examination is not otherwise required. Accurate detection of asymptomatic chlamydial disease in a timely,cost effective,and noninvasive manner as well as development of effective partner treatment strategies remain important challenges. This review provides a clinical update on office based testing for C Trachomatis, management and treatment options for the adolescent and young adult population (8,26).

Two additional nucleic acid type assays recently were developed: ligase chain reaction (LCR) and polymerase chain reaction (PCR). With these tests, detection is achived by exponential amplification of a specific DNA target sequence. Studies suggested that LCR and PCR in urine both men and women are more sensitive than culture; sensitivities for the nucleic acid tests reach 95% compared with 85% for cultures. A major problem,however,is the interpretation of positive tests in asymptomatic individuals in low prevelance populations; in this situation,the assay may represent residual DNA but non viable organisms(14,27). Leukocytes estrase screening. The leukocyte esterase test (LET) detects enzymes that are released by polymorphonuclear white blood cells. LET only confirms a diagnosis of urethritis; it fails to determine the specific causative agent of urethral inflammation.The test comes in the form of a dipstick on which a purple color is produced whrn indoxyl carbonate ester is hydrolyzed by leukocyte esterases. At present, LET is only recommended as a screening test for urethritis in adolescent boys. Because further studies are required to assess its usefulness,LET is not recommended for use in older men or in women as a chlamydia screening test (1,4,11,14,25,28). Serology Two serologic tests microimmunnofluorescence and complement fixation are available for use. Both require a high level of technical expertise,and have a little value in the rutine clinical care of patients with possible chlamydial genital infections (2,7,24,28,29).

Conclusion

The prevalence and financial impact of C trachomatis infection in Türkiye necessitate that family physician and gynecologist continue their survillance for this disease,especially in women,where the sequelae of untreated chlamydial infection are significant.

To reduce the morbidity and subsequent complications associated with Chlamydia trachomatis infection in Türkiye, effective control and prevention strategies must be implemented. Selective screening to detect asymptomatic infection is an essential component of all control programs. Without effective screening programs, women will continue to become infertile and to seek expensive surgery; ectopic pregnancies will occur and endanger mother’s life; and newborns will be at increased risk for exposure and greater chance of developing pneumonia and eye infection.

REFERENCES

1. Jones GE, Low JC,Machell J,Amstrong K. Compararison of five tests for the detectıon of antıbodıes against chlamydıal (enzootic) abortion of ewes. Vet Rec 1997. 141(7) :164-8.

2. Borisov I. Genital chlamydial infection in women studied with the new clearview chlamydia diagnostic. Akush Ginekol. 1994. 33(3):17-9.

3. Diaz Barreiro G, Diaz Lopez E, Servin Ramirez JF. Frequency of chlamydia trachomatis in the cervix of pregnant women during prenatal examinations. Ginecol Obstet Mex . 1997. (65). 48-51.

4. Ossewaarde JM, Rieffe M, Van Doornum GJ, Henquet CJ, Van Loon AM. Detection of amplified chlamydia trachomatis DNA using a microtiter plate based enzyme immunoassay. Eur. J. Clin Microbiol Infect. Dis. 1994. 13(9): 732-40.

5. Branigan DJ, Gerard HC , Hudson AP , Schumacher HR Jr. Comparison of synovial tissue and synovial fluid as the source of nucleic acids for detection of chlamydia trachomatis by polymerase chain reaction. Arthritis. Rheum. 1996. 39(10): 1740-6.

6. Valassina M, Cusi MG, Corsaro D, Buffi C, Piazzesi G, Valensin PE. Detection by multiplex polymerase chain reaction and typing of chlamydia trachomatis isolates. Fems. Microbiol. Lett. 1995. 130(2-3): 205-9.

7. Olafsson JH, Davidsson S, karlsson SM, Palsdottir R, Steingrimsson O. Diagnosis of chlamydia trachomatis infection in high risk females with PCR on first void urine . Acta Derm. Venereol. 1996. 76(3): 226-7.

8. Hirose T. Genetic diagnoses of chlamydia trachomatis DNA probe and PCR method. Rinsho Byori. 1994. 42(3):230-4.

9. Kay ID, Palladino S, Alexander R, Leahy BJ, Pearman JW. Evaluation of a commercial polymerase chain reaction assay for detection of chlamydia trachomatis. Diagn. Microbiol. Infect. Dis. 1997. 28(2):75-9.

10. Roblin PM, Gelling M, Kutlin A, Tsumura N, Hammerschlay MR. Evaluation of a new optical immunoassay for diagnosis of neonatal chlamydial conjunctivitis. J.Clin. Microbiol. 1997. 35(2): 515-6.

11. Rota S, Yıldız A, Koçtimur S, Akbaş E, Günay A, Güner H. Sample adequacy in detecting chlamydia trachomatis. Int J. Gynaecol. Obstet. 1995. 51(3).225-8.

12. Mitrani-Rosenbaum S, Tsvieli R, Lavie O, Boldes R, Anteby E, Shimonovitch S. Simultaneous detection of three common sexually transmitted agents by polymerase chain reaction. Am J. Obstet. Gynecol. 1994. 17(3). 784-90.

13. Herrmann B, Espinoza F, Villegas RR, Smith GD, Ramos A, Egger M. Genital chlamydial infection among women in Nicaragua : validity of direct flourescent antibody testing, prevalence, risk factors and clinical manifestations. Genitourin Med. 1996. 72(1):20-6.

14. Peterson EM. Laboratory detection of Chlamydia trachomatis. West J Med. 1997. 167(1). 36.

15. Radouani F, Takourt B, benomar H, Guerbaoui M, Bekkay M, Boutalep Y. Chlamydia infection and female low fertility in Morocco. Pathol Biol Paris.1997. 4586).491-5

16. Tong CY, Donnelly C, Hood N. Lowering the cut off value of an automated chlamydia enzyme immunoassay and confirmation by PCR and direct immunofluorescent antibody test. J.Clin Pathol.1997. 50(8):681-5.

17. Holder DW, Woods ER. Chlamydia trachomatis screening in the adolescent population. Curr.Opin.Pediatr. 1997; 9(4):317-24.

18. Gürer Ü, Yıldırım A, Çevikbaş A, Daşdelen N, İmamoğlu Ç, Derici K. Endoservikal örneklerde Chlamydia Trachomatis antijeni araştırılması. FEMS Workshop. Human Chlamydial infections İzmir. 1997.

19. Sciarra JJ. Sexually transmitted diseases : global importance. Int. J. Gynaecol. Obstet.1997; 58(1) : 107-19.

20. Paukku M, Puolakkainen M,Apter D,Hirvdnen s, Paavonen J. First void urine testing for Chlamydia trachomatis by polimerase chain reaction in asymptomatic women. Sex. Transm. Dis. 1997; 24(6): 343-6.

21. Liu D, Jones SL,Baird R, Pedersen J. Diluation of samples collected and transported for Gen Probe PACE 2 processing facilitates detection of Chlamydia trachomatis by Roche Amplicor PCR. J.Clin. Microbiol.1997; 35(8):2186.

22. Schachter J,Jones RB, Butler RC, Rice B. et al. Evaluation of the Vidas Chlamydia test to detect and verify Chlamydia trachomatis in urogenital specimens. J.Clin. Microbiol. 1997; 35(8) . 2102-6.

23. Witkin SS, Bongiovanni AM, Ingilis SR. Detection of endocervical anti-Chlamydia trachomatis immunoglobulin A in pregnant women by rapid , 6 minute enzyme linked immunosorbent assay: comparaison with PCR and chlamydial antigen detection methods. J. Clin. Microbiol. 1997; 35(7): 1781-3

24. Yıldırım A, Gürer Ü, Onganer E, Piran A, Çevikbaş Y, Çınar Y. Rahim içi araç kullanımının genital yol enfeksiyonlarına etkileri. 2. Uluslararası Jinekoloji ve Obstetrik Kongresi. Antalya. 1997.

25. Weyman K, Lanning AR. Screening guidelines for chlamydia trachomatis infection. Evaluating physician awareness, agreement,and use . Can.Fam.Physician.1995; 41: 228-36.

26. Wollenhaunt J,Hartmann F,KohlerL, et al. Evaluation of ELİSA to detect Chlamydia trachomatis antigen in urine samples from arthritis patients . Clin.Exp.Rheumatol.1997; 15(2): 169-74.

27. Kaltenbock B, Schmeer N, Schneider R. Evidence for numerous omp1 alleles of porcine Chlamydia trachomatis and novel chlamydial species obtained by PCR. J.Clin.Microbiol. 1997; 35(7):1835-41.

28. Koch A,Bilina A,Teodorowicz l,Stary A. Mycoplasma hominis and ureaplasma urealyticum in patients with sexually transmitted diseases. Wien. Klin. Wochenschr.1997; 109(14-15):584-9.

29. Choulakis V, Charvalos E, Guitis V, Sagia V, Tselentis J. Comparison of methods of detection of Chlamydia trachomatis in cervical samples by the PACE 2 Gen-Probe and by the Chlamydia Direct immunofluorescence kit (Chlamydia Direct IF). Arc.of Hellenic. Med.1997; 14(4):449-451.