

IMMUNOLOGICAL DETECTION METHODS, CYTOKINES TEST AND C-REACTIVE PROTEIN TEST IN WOMEN INFECTED WITH TRICHOMONAS VAGINALIS

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ABSTRACT: Trichomonas vaginalis is the most prevalent non-viral sexually transmitted infection, Nucleic acid amplification tests and point-of-care tests are newly available diagnostic methods that can be conducted on a variety of specimens, potentially allowing highly sensitive testing and screening of both women and men at risk for infection, The most commonly used method of diagnosis is a direct microscopic. We developed an indirect enzyme-linked immune sorbent assay (ELISA) for the detection of Trichomonas vaginalis which is both rapid and sensitive (detection limit of approximately 100 trichomonads per ml). that the ELISA is a significant improvement over the wet mount method for the diagnosis of trichomoniasis.as well as immunological staining of fixed specimens, Is a technique that permits visualization of virtually many components in any given tissue or cell type. This broad capability is achieved through combinations of specific antibodies tagged with fluorophores. Assays for anti trichomonad antibodies in either serum or vaginal secretions, and indirect immunofluorescence also was important as well as the cytokines test they allow your immune system to mount a defense if germs or other substances that can make you sick enter your body.And CRP test measures the level of C-reactive protein in a sample of your blood.

Keywords: Trichomonas vaginalis, cytokines and CRP, immunofluorescence, ELISA, women .

INTRODUCTION

Trichomonas vaginalis is a highly prevalent parasitic infection that causes the sexually transmitted disease (STD) trichomoniasis. Trichomonas vaginalis parasites preferentially infect the urethra in men and women, and vaginal and vulvar sites in women. Pharyngeal and respiratory infections in newborns born to mothers with vaginitis caused by T. vaginalis may represent yet another important manifestation of trichomoniasis(1). In addition, an increased incidence of endometritis during pregnancy has been implicated with this infection (2).

MORPHOLOGY

Studied parasite of all the trichomonas. This urogenital pathogen varies in size and shape, with the average length and width being 10 and 7 μm , respectively (2). Physiochemical conditions do alter the appearance of the parasite. In axenic culture, the shape of the

protozoan tends to be more uniform, i.e., pear shaped or oval (3), but the parasite takes on amore amoeboid appearance when attached to vaginal epithelial cells (3,4). *T. vaginalis* has only trophozoite stage with a size of (7-32 μm) and is pear shaped. It possesses 5 flagellates, 4 of which are forward with a fifth flagella that bends back along the undulating membrane and lacks the cyst stage and possesses a central nucleus and axostyle, Trophozoiteis divided by binary fission. The parasite is an aerotolerant anaerobe that dissolves whole carbohydrates into short chains of organic acids Especially (acetate and lactate) Regardless of the presence of oxygen. The parasite produces hydrogen molecules in the absence of oxygen, and this reaction occurs in hydrogenases that like mitochondria (which are not present) in *T. vaginalis*, which are energy producing organelles surrounded by two membranes (5).

PATHOGENESIS

Trichomoniasis accounts to almost half of curable sexually transmitted infections according to the world health organization (6,7) Women with trichomoniasis may be asymptomatic or may experience various symptoms, including vaginal discharge and vulvar irritation. Men with trichomoniasis may experience no gonococcal urethritis but are frequently asymptomatic.(8).The general infection areas include urethra, external genitalia, prostate, and epididymis.(9) It is also a known leading cause of prostatitis and urethritis.(10) Furthermore, serious complications may be associated with trichomoniasis such as premature rupture of the placental membranes, premature labor, and low birth weight in pregnant women infection, infertility, cervical cancer, pelvic inflammatory disease, birth outcomes, and increase in human predisposition to immunodeficiency virus (HIV), its transmission, and acquisition.(11,12) Infection with *T. vaginalis* is associated with higher genital HIV-1 levels. The treatment of women infected with *T. vaginalis* results in a 4.2-fold reduction in the quantity of HIV-1 in vaginal secretions. (11) Some recent studies have shown that trichomoniasis may be considered as one of the predisposing factors for some human disease such as prostate and cervical cancer. (13) The outcome of infection with *Trichomonas* may be due to genetic variability of the isolates and the host immune response. (14).s of *T. vaginalis* infection is based on their covey of the motile organism in the vaginal discharge or mucosal scraping of the vagina in female and urethral discharge in male, and it is able to detect the protozoa at concentration as low as three organisms (15). The traditional clinical diagnosis of vaginal infection is based on a history of patient, clinical finding observed during the vaginal specimen. This last one provides the most objective information. A microscope wet amount examination of the specimen permits, detection of the motile protozoa *T. vaginalis* (16).Although *T. vaginalis* is the most common cause of non-viral STD (17).

IMMUNOLOGY AND SEROLOGY TESTS (ELISA)

Several methods have been developed for the detection of the protozoan. These include in vitro culture of the organism, direct microscopic examination of smears both with and without the aid of vital stains (21, 22, 25, 32), immunological staining of fixed specimens (22, 24). Is a technique that permits visualization of virtually many components in any given tissue or cell type. This broad capability is achieved through combinations of specific antibodies tagged with fluorophores. Consequently, the possible applications in research and patient care are numerous, assays for anti-trichomonas antibodies in either serum or vaginal secretions (18, 22,23, 26, 27), and indirect immunofluorescence (19). and serological

methods suffer from the poor correlation between antibody titers and active infection (22, 23, 27). Thus, it appears likely that immunological detection of trichomonas antigens will prove to be the most sensitive approach to the diagnosis of trichomonas's Examination of sera or vaginal secretions for antibodies to the parasite offers little promise of being of diagnostic utility (18, 22, 23, 25, 27), primarily because of the lack of correlation between the presence of antibodies and an active infection. Using indirect immunofluorescence microscopy, several investigators (22, 25) reported that while 80 to 90% of patients with trichomonas's had circulating antibodies to the protozoan, 13 to 17% of a control population of patients did also. Their results in testing vaginal secretions for IgG or IgA antibodies to *T. vaginalis* were even less encouraging. Currently, there are no reports in the literature in which an ELISA is used for the detection of *T. vaginalis* antigens in clinical specimens. Here we have reported the development of a rapid, sensitive ELISA for the detection of *T. vaginalis* antigens in vaginal secretions. organisms have been observed by several serologic-based techniques including ELISA (18, 19), indirect immunofluorescence (22, 28, 29), and radio immunoprecipitation (19). Although investigators are currently studying the antigenic composition of the organism with monoclonal antibodies (20,22), data from these reports indicate that obtaining a single monoclonal antibody which recognizes all isolates of the organism could prove to be problematic. In addition, the two-site design of our assay requires antibodies with good affinity both bound to the solid phase and as detectors in solution in contrast to one-site assays developed for detecting the protozoan (e.g., immunofluorescence) (22). The ELISA used for antigen detection is rapid, easy to perform, and provides superior sensitivity over the wet mount method. The utility of such a format would be a major step in diagnosing it may be that there is systemic inflammation in the pathway leading to birth both at term and preterm (30)

CRP, CYTOKINES AND CBC TEST

Cytokines are signaling proteins that help control inflammation in your body. They allow your immune system to mount a defense if germs or other substances that can make you sick enter your body. Too many cytokines can lead to excess inflammation and conditions like autoimmune diseases. A c-reactive protein test measures the level of c-reactive protein (CRP) in a sample of your blood. CRP is a protein that your liver makes. Normally, you have low levels of c-reactive protein in your blood. Your liver releases more CRP into your bloodstream if you have inflammation in your body. High levels of CRP may mean you have a serious health condition that causes inflammation.

The increased C-reactive protein and cytokines in the sera of *T. vaginalis* infected women suggests that the impact of the immunoinflammatory reaction to the parasite exceeds the boundaries of the reproductive tract mucosa (31). a significant decrease in concentration of Hb, PCV in infected woman s with *T.vaginalis* infection ,may be due to hemolysis of RBCs and phagocytosis by *T.vaginalis* parasite and the increased bleeding through menstrual cycle and this leads to decrease in the number of RBCs and the hemolysis of RBCs may lead to decrease in the Hb concentration (10;11). One of the most frequent causes of anemia in *T. vaginalis* infection, a decrease in MCV, MCH and MCHC in women infection with. *T vaginalis* parasite, a decrease in MCV may be due to a decrease in Hb and decrease INCH is caused by iron deficiency anemia that lead to decrease in formation of Hb in RBCs The results also provided decrease in level of PCV in patient women may be due to a decrease in

RBCs counts or due to decrease in MCV caused by decreased level of Hb in RBCs. About 50% of infected women with *T.vaginalis* punctuate hemorrhages can be observed (2).a significant increase in WBCs; these due to an increase in the number of monocyte, lymphocyte, neutrophils, and Basophils because the infection with this parasite causes stimulation immune system of host humeral and cellular. The results also revealed Basophilia associated with patients who suffering from *T. vaginalis* infection; these phenomena are not fully understood. The reason for this observation may be attributed to allergy disorder which is one of symptoms of *T. vaginalis* infection these allergies.

HIV AND TRICHOMONIASIS

The incidence of *T. vaginalis* infection is higher among HIV-infected individuals compared with those who are not HIV-infected (32). Up to 52.6% of HIV-infected women have been found to be connected with *T. vaginalis* (33,34). Among HIV-infected women, *T. vaginalis* infection is significantly associated with pelvic inflammatory disease (PID) (35), and treatment of *T. vaginalis* infection is associated with significant decreases in genital tract viral load and vaginal HIV viral shedding (36, 37). Among HIV-infected men, data are scant. Both HIV acquisition and transmission have been studied in relationship to *T. vaginalis* infection. *Trichomonas vaginalis* infection is epidemiologically associated with HIV acquisition. A prospective study of 3297 African HIV-serodiscordant couples found that *T. vaginalis* infection is an independent risk factor for HIV acquisition; *T. vaginalis* infection of the female partner was associated with an increased per-act probability of her acquiring HIV during sex (OR, 2.57[95% CI, 1.42–4.65]) (38). *Trichomonas vaginalis* infection also has been associated with a potential for increased transmission of HIV. *T. vaginalis*–uninfected controls showed that *T. vaginalis*–infected women who were effectively treated for *T. vaginalis* infection were less likely to shed HIV vaginally at 3 months’ post treatment compared with baseline (RR, 0.34 [95% CI, 1.2–9.2]), while there was no change for *T. vaginalis*–uninfected women (37). Several studies have investigated the implications of maternal *T. vaginalis* infection during pregnancy; the most established association is with preterm delivery. A prospective cohort study of 13 816 pregnant women in 5 US cities found that *T. vaginalis* infection at midgestation was significantly associated with low birth weight (aOR, 1.3 [95% CI, 1.1–1.5]), preterm delivery (aOR, 1.3 [95% CI, 1.1–1.4]), and preterm delivery of a low birth-weight infant (aOR, 1.4 [95% CI, 1.1–1.6]) (39). Further study is urgently needed to determine whether treatment of trichomoniasis during pregnancy can reduce such complications.

INFERTILITY

Trichomoniasis could plausibly interfere with male and female fertility, although few studies have been conducted to investigate this potential connection. Among men, an in vitro study showed that *T. vaginalis* parasites can adhere to, immobilize and phagocytose sperm cells (40). A Turkish study found that among 80 infertile men, 2.5% had a positive *T. vaginalis* test by PCR, but serology was not available (41). Among women, a study of 321 women with tubal infertility in Seattle found that the RR of tubal infertility was significantly higher among women who self-reported a history of trichomonas’s (adjusted RR, 1.7 [95% CI, 1.1–2.6]) (42).

TREATMENT

Medications approved by the US Food and Drug Administration (FDA) for treatment of trichomonas's include metronidazole (since 1963) and tinidazole (since 2004). Standard therapy consists of either metronidazole or tinidazole in a single 2-gdose taken orally, or, if necessary, intravenously. The CDC also recommends an alternative regimen of metronidazole 500 mg orally twice a day for 7 days. Tinidazole has a half-life of approximately 12.5 hours, compared with a half-life of 7.3 hours for metronidazole (43).

PREVENTION

Trichomoniasis is an STD that can be avoided by abstaining from sex. Among sexually active individuals, the most effective way to prevent trichomoniasis is by using condoms consistently and correctly during vaginal-penile sexual encounters (44,45). Periodic presumptive treatment for high-risk individuals such as sex workers can effectively reduce trichomoniasis (44,45). Sex workers can effectively reduce trichomoniasis (47-49). Sex workers can effectively reduce trichomoniasis (45,46). and *T. vaginalis* infections can also prevent associated conditions such as HIV infections and complications of pregnancy.

CONCLUSION

Trichomonas vaginalis infection is highly prevalent, often asymptomatic, and easily communicable between sex partners. Infection is associated with significantly increased risks of HIV acquisition and transmission, pregnancy complications including preterm delivery, PID among HIV-infected women, and other conditions. Usually, trichomoniasis can be cured with single-dose therapy of an appropriate nitroimidazole antibiotic (eg, metronidazole or tinidazole), but women who are also infected with HIV should receive therapy for 7 days. Antimicrobial resistance is an emerging concern. Screening should be provided at least annually to all HIV-infected women. Increase in cytokines and CRP concentrations in the serum of women infected with *T. vaginalis*, indicates a stimulation of the humoral immune response during the infection with *T. vaginalis*. and decrease of HB, PCV, MCV, MCH and MCHC due to a decrease in Hb and decrease in MCHC is caused by iron deficiency anemia that lead to decrease in formation of Hb in RBCs decrease in level of PCV and the hemolysis of RBCs may lead to decrease in the Hb concentration and increase of level lymphocyte, monocyte, neutrophil and basophil in infected woman's because the infection with this parasite causes stimulation immune system of host humeral and cellular, as well as allergy disorder is one of symptoms of *T. vaginalis* infection.

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