Review paper

CLINICAL AND DIAGNOSTIC ASPECTS OF LOWER GENITAL TRACT INFECTIONS

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SUMMARY

Lower genital tract infections, e.g. vulvovaginitis, cervicitis and urethritis included are common, both in females, and males, in the reproductive period of life. They are source of further spread, and may lead to pelvic inflammatory disease. The symptoms and signs of lower genital tract infections, such as abnormal vaginal discharge, pruritus as well as cutaneous and mucous lesions, are not specific enough to establish the diagnosis. Therefore it is necessary to apply selectively relatively simple screening and confirmatory laboratory tests. A precise diagnosis of lower genital tract infections would improve an early diagnosis of important STDs in the community, and would help in promoting management strategies for genital tract infections.

KEY WORDS

lower genital tract infections, vulvovaginitis, cervicitis, urethritis

INTRODUCTION

Differences in male and female anatomy and reproductive physiology account for the greater risk of complications of certain sexually transmitted diseases (STDs) in women and also for the greater difficulty in differential diagnosis of urogenital infections in women. In fact, the difficulty in diagnosing sexually transmitted urogenital infections in women undoubtly results in delay of proper therapy, which contributes to the higher risk of complications in women and to further spread of infection in community.

Although the etiology of certain genitourinary and anorectal inflammatory conditions in women is still not well understood, it is now possible to identify many common and potentially serious STDs in women by clinical observations of symptoms and signs, supplemented with the selective use of relatively simple screening and confirmatory laboratory tests.

VULVOVAGINITIS

Abnormal vaginal discharge and vulvar pruritus are the most common symptoms with which women attend a gynecological health service clinics. Vaginal infection is mainly caused by Candida albicans, due to an overgrowth of certain bacteria or Trichomonas vaginalis (1).

Trichomoniasis is the most prevalent non-viral sexually transmitted disease (2). The prevalence of the disease varies widely in different populations. In asymptomatic patients attending family planning clinics,

5% of women suffer from this disease (3). Multiple sexual partners, previous history of sexually transmitted diseases, coexistent infection with other STDs, and use of either barrier or hormonal contraceptives are known risk factors for acquisition of trichomonas (4).

As with other STDs, symptoms and signs of trichomoniasis are neither adequately sensitive nor specific enough and necessitate diagnostic testing. Trichomonal infections are asymptomatic in as many as 50% of male and female patients (5,6).

The most common complaints associated with trichomoniasis are vaginal discharge and vulvovaginal irritation in women and urethral discharge in men. Discharge is presented in 50% to 75% of infected women (7). Infection is described as pruritic or irritating in 25% to 75% (7,8,9). Other associated symptoms include dyspareunia (10), dysuria, and in a small number of patients, some degree of lower abdominal pain (9).

Excessive vaginal discharge is present in 50% to 70% of patients (6,9,10). The classically described frothy or bubbly yellow-green discharge is present in less than one half of these patients. Vulvar erythema or excoriation is an uncommon finding, but vaginal erythema is noted in as many as 75% of the patients (9). "Strawberry cervix" created by capillary dilatation and punctate hemorrhages is visible to the naked eye in only 2% of cases but by colposcopy is evident in as many as 90% (5). Unless coexisting infection with chlamydia or Neisseria gonorrheae is present there should be no evidence of endocervical (mucopurulent) discharge with trichomonal infection. If findings of endocervitis are present, the patient should be evaluated for C. trachomatis and N. gonorrhoeae infections.

The time-honored approach for the diagnosis of trichomonal infection has been microscopic evaluation. A sample of vaginal fluid is placed in normal saline and viewed under phase-contrast microscopy. The diagnosis of trichomonas is made by directly observing the motile parasite. Other labaratory procedures used for diagnosis include staining with acridine orange (11) or Giemsa (12), Papanicolaou stain (13,14) and fluorescent monoclonal antibody testing (13).

Candida is the second most common cause of vaginal infections and the incidence of candidal vaginitis has increased. It was estimated that 75% of women have at least one episode of vulvovaginal candidiasis during their child-bearing years, and approximately 40-50% of these experience a second attack (15).

Prevalence studies indicate that candida may be isolated from the genital tract of approximately 20% of asymptomatic healthy women in their child-bearing years (16). 25% to 40% of women who have positive cultures for candida after vaginal sampling are asymptomatic carriers. The natural history of asymptomatic colonization is unknown, although both animal and limited human studies suggest that vaginal carriage may continue for several months and perhaps years (17). Several factors are associated with increased rates of asymptomatic vaginal colonization with candida. These include pregnancy (30%-40%), use of high-estrogen oral contraceptives and antibiotics, and uncontrolled diabetes mellitus (15,17,18). The rarity of candida isolation in girls before menarche and the lower prevalence of candidal vaginitis after menopause emphasize the hormonal dependence of this infection (17).

Acute pruritus and vaginal discharge are the usual presenting complaints, but these symptoms are not specific for vulvovaginal candidiasis or invariably associated with it. The most frequent symptom is vulvar pruritus, which occurs in virtually all symptomatic patients (19). Vaginal discharge is not present invariably and frequently is minimal. Although described as typically cottage cheese-like in character, the discharge may vary from watery to homogeneously thick. Vaginal soreness, irritation, vulvar burning, dyspareunia, and external dysuria commonly occur. Bad odor, if present, is minimal and not offensive. Examination frequently shows erythema and swelling of the labia and vulva, often with discrete pustulopapular peripheral lesions. The cervix is normal, and vaginal mucosal erythema is present together with an adherent whitish discharge. Characteristically, the symptoms are exacerbated in the week preceding the onset of menses with some relief after the onset of menstrual flow.

There is a clinical range of candidal vaginitis. In some patients, a more exudative syndrome occurs with copious discharge and white plaques, exemplifying the description of vaginal thrush. At the other end of the range are those patients with minimal discharge and severe erythema, particularly with extensive vulvar involvement and often extending into the inguinal and perianal regions. In general, there is a quantitative relationship between the classic signs and symptoms of vulvovaginal candidiasis, notably pruritus and vulvitis, and the number of genital yeast present. Although Candida species occasionally cause extensive balanoposthitis in male partners of women with vaginal candidiasis, a more frequent event is a transient rash, erythema, and pruritus or a burning sensation

of the penis that occurs minutes or hours after unprotected intercourse (17).

Most patients with symptomatic vaginitis can be diagnosed readily on the basis of simple microscopic examination of vaginal secretions. Accordingly, a wet mount or saline preparation should be done routinely, not only to identify the presence of yeast and mycelia, but also to exclude the presence of clue cells and trichomonas. Large numbers of leukocytes also invariably are absent and when present, should suggest a mixed infection. The potassium hydroxide 10% preparation is extremely useful and even more sensitive than the wet mount in diagnosing the presence of germinated yeast. The vaginal pH is normal in candidal vaginitis, and finding a vaginal pH in excess of 4.7 indicates bacterial vaginosis, trichomoniasis, or a mixed infection.

The low sensitivity of light microscopy is shown by the finding that up to 50% of patients with culture-positive symptomatic candidal vaginitis will have negative microscopic results. Although routine cultures are unnecessary, vaginal cultures should be done in the presence of negative microscopic results (17).

The Papanicolaou smear is unreliable as a diagnostic test, it is positive in approximately 25% of cases. Positive direct microscopic findings usually correlate with relatively high yeast concentrations in vaginal secretions, as confirmed by quantitative vaginal cultures (15). In most women, yeast number correlates with the severity of clinical signs and symptoms, and finally that commensal yeast vaginal carriage tends to be associated with a lower number of vaginal yeast (15). Diagnosis requires a correlation between clinical findings, microscopic examination, and finally, vaginal culture.

Gardnerella vaginalis was thought to be the causative agent of bacterial vaginosis. Later, this microbe was found to be present in the vaginas of 40-50% of patients without bacterial vaginosis and also in those cured of bacterial vaginosis (20).

The term bacterial vaginosis was introduced to describe increased vaginal discharge without signs of clinical inflammation and noticeable absence of leukocytes (21). The vaginosis was called bacterial because of absence of fungi and parasites as the cause of this syndrome.

This disorder is characterized by a decrease in aerobic lactobacilli and an increase in anaerobic lactobacilli and obligate anaerobes: Gardnerella and Mycoplasma. Predominant anaerobic organisms are Bacteroides sp., peptostreptococci, and Mobiluncus. There are clue cells, numerous free-floating bacteria, and absence of leukocytes. It is a polymicrobial condition in which a decrease in vaginal acidity and in the concentration of lactobacilli is accompanied by an increase of a 100-fold or more in the concentration of other organisms (22).

Malodorous vaginal discharge and mild vulvar itching or burning are common symptoms of bacterial vaginosis. However, such symptoms could be absent in approximately one half of the women with bacterial vaginosis. At least three of the following four criteria must be fulfilled to establish the diagnosis:

1. Thin homogeneous discharge that adheres to, but could be easily wiped from the vaginal wall.
2. Vaginal pH more than 4.7.
3. Presence of clue cells in the vaginal discharge.
4. Positive amine odor test (23).

More recently it has been demonstrated that the use of two of the four criteria, like clue cells and positive amines are enough for use as diagnostic criteria alone (24).

Women with bacterial vaginosis usually complain of an increased vaginal discharge that is somewhat thin and sticky, tends to adhere to the vaginal wall, and might be present during introitus. The discharge also has a disagreeable or fishy odor that frequently is noticeable after intercourse. Mild to moderate itching may occur along with the vaginal discharge. Seminal fluid often can be confused with the malodorous discharge of bacterial vaginosis, and detection of sperm may aid the diagnosis. Clue cells and changes in bacterial flora can be found in the Papanicolaou smear, which normally would be an incidental finding. The presence of clue cells in the Pap smear showed a sensitivity of 90% and a specificity of 97% (25).

Although G. vaginalis might play a role in the polymicrobial syndrome of bacterial vaginosis and there are different selective media available for its isolation, culturing of this organism is not recommended routinely in the diagnosis of bacterial vaginosis because it is a common member of endogenous vaginal flora and vaginal colonization in women treated for bacterial vaginosis might be similar to that in healthy control subjects (26).

CERVICITIS

Two types of cervicitis can be distinguished: endocervicitis also known as mucopurulent cervicitis and ectocervicitis. Causes of endocervicitis include C. trachomatis, N. gonorrhoeae, and herpes simplex virus. Herpes simplex virus infection can also be associated with ectocervicitis.

Endocervicitis

Endocervicitis is based largely on the clinical diagnosis of urethritis in the male and on treatment of the female sex partners of men with urethritis. Because endocervicitis produces symptoms less often than male urethritis, and symptoms of endocervicitis (e.g., vaginal discharge) are less distinctive than symptoms of urethritis, the careful assessment of clinical signs of mucopurulent cervicitis, and the appropriate use of laboratory tests for detection of subclinical infection of females, are of paramount importance in the control of gonococcal and chlamydial infections (1).

Infection of cervix represents a reservoir for sexual or perinatal transmission of pathogenic microorganisms, and might lead to at least two possible types of complications in the female:

1. ascending intralumenal spread of pathogenic organisms from the cervix, producing endometritis and salpingitis
2. ascending infection during pregnancy, resulting in chorioamnionitis, premature rupture of membranes, premature delivery, amniotic fluid infection, and puerperal infection.

The lack of widely recognized objective signs of cervical inflammation is presented by the confusing nomenclature for endocervicitis. Terms such as acute and chronic cervicitis, cervical erosion, mucopurulent cervicitis and hypertrophic cervicitis have all been used. This confusion results in part from the changes which occur in the cervix over the reproductive period and during the menstrual cycle (27,28,29), and in part from difficulty in differentiating normal ectopic columnar epithelium from endocervicitis. The later differentiation is complicated by the fact that cervical ectopy appears to be correlated with cervical infection by C. trachomatis (30,31,32). Ectopy is present in the majority of younger teenage girls, and decreases steadily in prevalence with increasing age. Mucopurulent endocervical discharge is defined as yellow endocervical exudate or >30 neutrophils per microscopic field (400x) in endocervical mucus as demonstrated by Gram stain.

Mucopurulent cervicitis appears as inflamed endocervix on physical examination or optimally by colposcopy with manifestations such as yellow endocervical discharge, edema, and erythema of the zone of ectopy, and easily induced endocervical bleeding (1).

Ectocervicitis

Routine colposcopic examination of female STD clinic patients has shown that cervical HSV infection is highly correlated with cervical ulcers or necrotic lesions, while trichomoniasis is correlated with colpitis macularis, and both C. trachomatis and cytomegalovirus infection of the cervix are correlated with colposcopic features of immature metaplasia (33). Immature metaplasia was defined as faint acetowhite epithelium within the transformation zone. C. albicans, and T. vaginalis, also can produce ectocervicitis, but both are associated with other manifestations of inflammation of the contiguous stratified squamous vaginal epithelium.

The presence of cervicitis can be confirmed by a variety of supplementary diagnostic procedures, most of which should be available to clinicians specializing in treatment of genital infections of women. These include Gram stain of endocervical mucus, cervical cytology, colposcopy, and cervical biopsy. The microbial etiology of cervicitis can be presumptively established by Gram stain of endocervical mucus and further substantiated by isolation of C. trachomatis, N. gonorrheae, or HSV or by detection of specific microbial antigens, for example, by direct immunofluorescence.

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