

A Guide to the Diagnosis and Treatment of Vaginitis and Cervicitis

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Primarily care physicians should be proficient in diagnosing and treating vaginitis and cervicitis, because these are among the most commonly encountered problems in the ambulatory care of women. This review is intended to provide up-to-date information to help physicians who are not gynecologists effectively examine their patients and diagnose and treat these problems in an outpatient setting.

OVERVIEW

It is common for physicians who are not gynecologists to feel that their skills are inadequate to perform pelvic examinations for either routine screening or for evaluation of symptoms. However, performing pelvic examinations for the evaluation of vaginitis and cervicitis does not require mastery of complicated procedures or techniques. It does, however, require familiarity with the normal appearance of the female genitalia throughout the life span of a woman, as well as common deviations arising from infectious and inflammatory processes.

Evaluation of vaginitis or cervicitis requires a thorough history, a pelvic examination, and appropriate laboratory testing. An accurate diagnosis cannot be made based on a history and visual inspection alone, and although commonly offered, empiric therapy on this basis is inappropriate. With the aid of a few simple, inexpensive office tests, a reasonably accurate diagnosis can be made, and specific therapy can be prescribed.

EVALUATION

History

In the asymptomatic woman presenting for a routine screen, a brief gynecologic history should be elicited before performing a visual inspection. The physician should ask about the date of the last menstrual period or approximate year of menopause, prior gynecologic surgery, any recent abnormal bleeding, discharge, pelvic pain/dyspareunia, and associat-

ed urinary tract symptoms. The physician should also ask about the method of contraception used (if age-appropriate).

It is particularly important to keep in mind that women in their reproductive years will commonly have a clear odorless mucoid discharge that may be especially profuse around ovulation. This may be interpreted by some women as abnormal, and they should be educated about normal vaginal secretions.

In the symptomatic woman, further history should be obtained regarding the nature of any discharge that is present, specifically the duration, color, and presence of odor. In addition, inquiries should be made regarding the quality and duration of pain, the presence of fever, and the use of over-the-counter treatments.

Visual Inspection

To facilitate the pelvic examination, it is very important to have all necessary supplies readily available and arranged in advance, in such a way that the examiner or an assistant can easily reach them.

The following items should be routinely available:

- Specula
- Cytobrush/Spatula
- Glass slides
- Fixative
- pH paper
- Cotton swabs
- Culturettes—bacterial and viral

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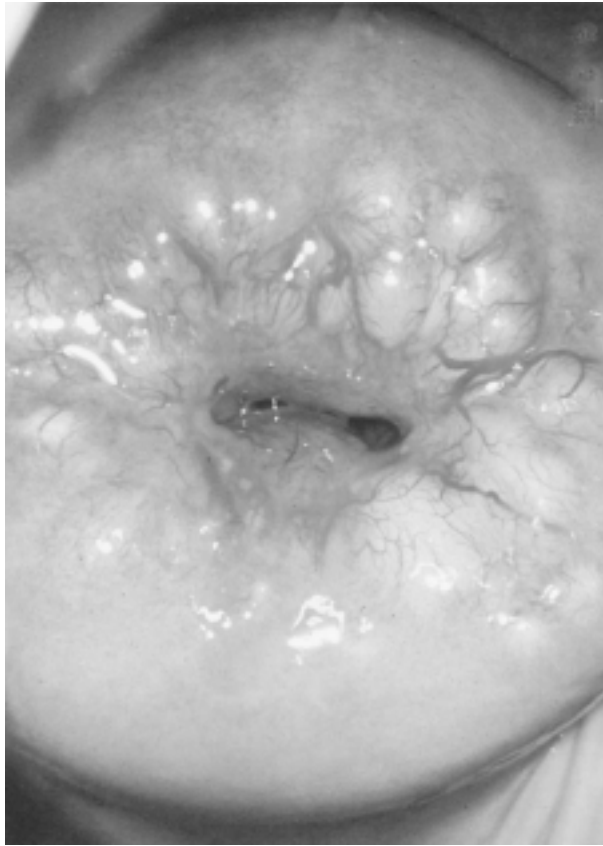


Figure 1. Nabothian cysts. Reprinted with permission from Burghardt E, Östör AG: *Colposcopy, Cervical Pathology: Textbook and Atlas*, 2nd ed. New York: Thieme Medical Publishers, 1991:224.

- Potassium hydroxide (KOH) solution, 10% to 20%
- Normal saline
- Lubricant
- Fecal occult blood cards
- Warm water
- Adjustable light source
- Coverslips

It is important to have a variety of specula available to provide the best visualization while promoting patient comfort. The standard Graves speculum comes in small, medium, and large sizes, with the medium size working well for most women. Care should be taken, however, to select the appropriate size based on patient history and initial inspection of the perineum. For example, selecting a small one for virginal or postmenopausal women or a large one for an obese patient before insertion may avoid excessive discomfort. The

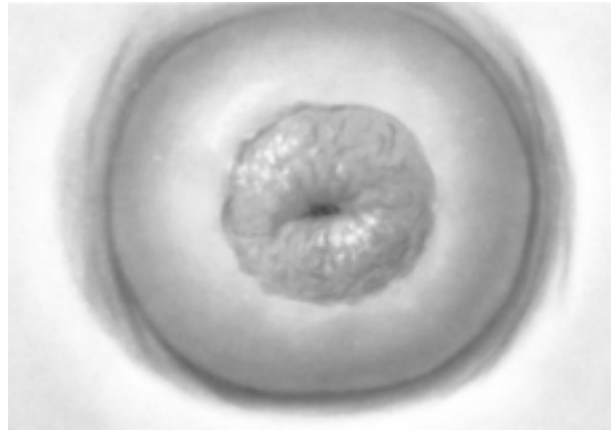


Figure 2. Cervical ectropion. Reprinted with permission from Netter FH: Reproductive system. In *The Ciba Collection of Medical Illustrations*, vol 2. Oppenheimer E, ed. Summit, NJ: Ciba Pharmaceutical Products, 1954:164.

Pederson speculum, which is both narrow and long, may be useful, as well.

The examination should begin with inspection of the external genitalia in the dorsal lithotomy position. Particular attention should be given to erythema, edema, excoriations, ulcerations, or vesicles. Throughout the examination, the practitioner should verbally guide the patient, letting her know in advance what is being performed. Feedback from the patient about discomfort should be solicited.

Before insertion of the speculum, the labia should be gently parted. The speculum should be pre-moistened in warm water, while keeping in mind that most lubricants can interfere with results of microbiologic or cytologic studies. Insertion of the speculum should be performed with the blades in the anterior/posterior position, by using gentle downward pressure while rotating the blades laterally. Observation should begin during insertion, noting that the anterior walls have rugae in a premenopausal woman. Close inspection of the vaginal mucosa and cervix should include a survey for erythema, discharge, atrophy, and lesions. A common pitfall for less experienced examiners is to interpret normal variants, such as nabothian cysts (**Figure 1**) or ectropion (**Figure 2**), as disease. The misidentification of these features leads to many unnecessary gynecologic referrals.

In especially obese patients, the pelvic examination may be difficult. Vaginal side walls may prolapse centrally, obscuring the view of the cervix. If this happens, it may be useful to withdraw the speculum and thread it through a cut digit from a latex examination glove.

This will serve as a vaginal wall retractor, allowing visualization of the cervix (**Figure 3**). Any time there is difficulty locating a cervix, the speculum should be removed and the cervix located digitally.

In the presence of a discharge, the vaginal pH should be tested by placing a strip of pH paper in pooled secretions. Normal vaginal pH is 3.8 to 4.2.

The endocervix should be cultured for gonorrhea and chlamydial infection in the presence of an abnormal cervical discharge, or if indicated by the patient's history. Cotton swabs should be rotated in the endocervical canal and should remain there for 15 to 20 seconds. Viral cultures, however, should be obtained only when herpes is suspected. These are taken by placing a cotton swab into an unroofed vesicle.

Secretions should be sampled by using a moist cotton swab and should be placed on 2 glass slides. A drop of normal saline should immediately be placed on one slide, and potassium hydroxide (KOH) should be added to the other. While adding the KOH, the examiner should note the presence or absence of an amine odor ("whiff" test) before placement of a coverslip. Microscopic examination of slides begins at low power (10X), in order to survey the slide for an appropriate area on which to focus. Oil immersion is unnecessary in the diagnosis (**Table 1**).

DIAGNOSIS AND TREATMENT OF VAGINITIS

Candida Vulvovaginitis

Although candidiasis is uncommon in women during postmenopausal years, at least 70% of women who are premenopausal experience it at some point.¹ *Candida albicans* is the causative species in 80% to 92% of these infections.² Non-*Candida albicans* infections are on the rise, partly because of the empiric use of over-the-counter anti-fungal agents in the absence of infection.

Diagnosis should be carefully made, considering that up to 50% of women diagnosed with a *Candida* infection do not in fact have a fungal infection.³ Candidiasis is not a sexually transmitted disease, although the evaluation of a male partner for balanitis may be indicated in cases of recurrent infection. There is an increase in candidiasis in women after becoming sexually active,⁴ in those using an intrauterine device,⁵ in those who use oral contraceptives,⁶ and in those having taken antibiotics. Candidiasis develops in 25% to 70% of women taking antibiotics.⁷

Diagnosis. Patients typically complain of pruritus and burning, which is often exacerbated by urination or sexual intercourse. They will commonly complain of a discharge, as well. On physical examination, the vagi-



Figure 3. Vaginal wall retractor made from a cut nonsterile examination glove. Courtesy of the audiovisual department of Cook County Hospital, Chicago, IL.

na is characteristically erythematous, and a thick, adherent, white "cottage cheese-like" odorless discharge is often present, though these findings may not be present. With a *Candida* infection, the pH level is in the normal range (4.0 to 4.5), and the whiff-test result is negative. Also, the saline or KOH preparation usually reveals hyphae or budding yeast. The KOH slide may also reveal pseudohyphae. It is appropriate to diagnose a *Candida* infection with erythema and a normal pH in the absence of microscopic confirmation, however, because yeast forms are seen only 50% to 70% of the time even when *Candida* is present.^{8,9}

Because of its cost, the culturing of *Candida* organisms is probably only justified in the presence of repeated infection. Some believe it should be performed whenever the results of a microscopic examination are negative in the face of clinical candidiasis.¹⁰

Treatment. Treatment should be reserved for symptomatic women and is of no benefit to the patient with yeast noted on a cytologic specimen but who is otherwise asymptomatic.¹¹ In symptomatic women with a positive cytologic diagnosis, 80% do have *Candida* organisms present,¹¹ but this often represents colonization and not infection.

Topical antimycotic agents are curative in 80% of women,¹² although oral agents appear equally effective and patient preference should dictate the choice of route. The Centers for Disease Control and Prevention's treatment guidelines for vulvovaginal candidiasis are shown in **Table 2**. For uncomplicated candidiasis, a number of topical azole therapies are equally effective, including butoconazole, clotrimazole, miconazole, terconazole, or tioconazole (**Table 3**).

Table 1. Characteristics of Vaginal Discharge

Condition	Color	pH	Leukocytes	Whiff Test	Wet Mount
Normal	White	3.8–4.2	None	Negative	Negative
Bacterial vaginosis	Gray	5.0–6.0	Few	Positive	Saline: presence of clue cells
<i>Candida</i> infection	White	4.0–5.0	None	Negative	KOH: presence of hyphae
<i>Trichomonas</i> infection	Yellow-gray	6.0–7.0	Many	Positive or Negative	Saline: presence of motile protozoa

Table 2. Treatment Guidelines for Vulvovaginal Candidiasis

Recommended regimens

Fluconazole, 150 mg orally in a single dose or
 Topical application of butoconazole, clotrimazole, miconazole, nystatin, terconazole, or tioconazole

Recommendations for recurrent cases (4 or more episodes)

Initial intensive regimen for 10–14 days; maintenance regimen for 6 months
 Maintenance regimen of ketoconazole, 100 mg orally daily, for 6 months

Management of sex partners

Treatment not recommended (treatment of male partners does not reduce frequency of recurrences in women)
 Male partners with balanitis may benefit from treatment

Adapted from 1998 guidelines for treatment of sexually transmitted diseases. Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep* 1998;47(RR-1):1–111.

Fluconazole, in a 150 mg single oral dose, is the only United States Food and Drug Administration (FDA)-approved oral agent and is well tolerated, with the rare side effects of rash, headache, and gastrointestinal upset.¹³ The single dose maintains therapeutic vaginal levels of medication for 72 hours, so in the patient with severe vaginitis, an additional dose may be needed in 4 days.¹⁴ Fluconazole is contraindicated in pregnancy. It should be avoided in patients with liver disease because of the risk of toxicity.

In women with severe infection, oral therapy may not provide immediate relief from symptoms. Topical low-potency steroids may be used briefly for symptomatic relief in severe cases, but high-potency steroids may exacerbate symptoms.¹⁰

Patients experiencing treatment failure may harbor *Candida* organisms with resistance to azoles, and they should not be treated with multiple trials. These fail-

ures often represent infections with other species of *Candida*, most commonly *C. glabrata*, and patients may benefit from vaginal applications of boric acid (600 mg in size 0 gelatin capsules daily for 14 days) or nystatin.

Recurrent candidiasis, defined as 4 or more documented episodes in 1 year, occurs in less than 5% of healthy women¹⁵ and should prompt testing for diabetes mellitus and HIV-infection, as well as the examination of male partners for balanitis as a potential reservoir and source of reinfection. Treatment for recurrent disease involves an intensive topical azole regimen used nightly for 10 to 14 days, followed by a continuous topical maintenance regimen for 6 months (Table 2). Oral ketoconazole, though not FDA-approved for this use, can be used at a dosage of 100 mg daily for 6 months (Table 2). An alternative regimen of oral ketocolazole, aimed at eradicating the rectal reservoir of yeast, is 200 mg twice daily for 5 days, followed by 100 to 200 mg daily for 6 months.¹¹ Ketoconazole is hepatotoxic, however, and should be avoided in patients with liver disease. In older patients, liver functions should be monitored during prolonged treatment. Maintenance regimens should last at least 6 months—10% of women experience recurrences during this period.¹⁶ After maintenance, however, recurrence rates are high, occurring in 30% to 40% of women.¹⁶

Bacterial Vaginosis

Bacterial vaginosis is the most common type of vaginitis in women of reproductive age,⁴ with reported rates of 10% to 25% in the general population, and up to 64% in patients in clinics for sexually transmitted diseases.^{17–19} Bacterial vaginosis represents an alteration in the normal vaginal flora, with a predominance of anaerobes and the presence of *Gardnerella*, *Mycoplasma*, and *Mobiluncus* species. Although it may be transmitted sexually, it is not considered a venereal disease. Half of women with bacterial vaginosis are asymptomatic. Although pruritus is not common,¹⁷ the presence of a discharge is common. Patients frequently complain of vaginal odor, especially during menses and after intercourse.

Table 3. Topical Treatments for Uncomplicated Candidiasis

Agent	Brand Name	Dosage Regimen
Butoconazole 2% cream	Femstat	5 g intravaginally for 3 days
Clotrimazole 1% cream	Gyne-Lotrimin	5 g intravaginally for 7-14 days
	Mycelex-7	5 g intravaginally for 7-14 days
Clotrimazole vaginal tablets	Gyne-Lotrimin	100 mg insert daily for 7 days
	Mycelex-7	100 mg insert daily for 7 days
	Mycelex-G	500 mg tablet once
Miconazole 2% cream	Monistat 7	5 g intravaginally daily for 7 days
Miconazole suppositories	Monistat 3	200 mg suppository daily for 3 days
	Monistat 7	100 mg suppository daily for 7 days
Terconazole 0.4% cream*	Terazol 7	5 g intravaginally for 7 days
Terconazole 0.8% cream*	Terazol 3	5 g intravaginally for 3 days
Terconazole suppositories*	Terazol 3	80 mg suppository daily for 3 days
Tioconazole 6.5% vaginal ointment	Vagistat-1	5 g intravaginally once

*Available by prescription only.

Adapted from Sobel JD: Vaginitis. *N Engl J Med* 1997;337:1899.

Diagnosis. The vagina is notable for its lack of inflammation or excoriations. There may be a thin white or gray discharge, and the pH is invariably greater than 4.5. The whiff-test result is positive, because of the fact that when alkaline KOH is added to anaerobes, amines are released. The hallmark for the diagnosis of bacterial vaginosis is the presence of the clue cell on the saline wet mount at high power (100X), which is an epithelial cell with adherent bacteria, causing a granular appearance. White blood cells, which are numerous in trichomonal infections, are limited in number in bacterial vaginosis. In patients with 3 of the above findings, diagnostic accuracy is 90%.¹¹ Culturing of *Gardnerella vaginalis* is unnecessary, because colonies of this organism develop in many asymptomatic patients.

Treatment. Metronidazole and clindamycin are effective treatments for bacterial vaginosis, both in oral and topical forms (Table 4). The single dose, oral metronidazole alternative regimen should be considered when compliance is an issue; it has a 70% efficacy rate as opposed to the 90% efficacy rate of the 1-week oral metronidazole course. Treatment of sexual partners is not suggested unless a patient has repeated episodes. It is important to note that in approximately one third of women, the disease will recur within 3 months²⁰ and will require prolonged therapy for 10 to 14 days. It is critical whenever metronidazole is prescribed that patients be cautioned against concomitant use of alcohol because of its disulfiram-like action.

Table 4. Treatment Guidelines for Bacterial Vaginosis

Recommended regimens

Metronidazole, 500 mg orally, twice daily for 7 days, *or*
 Clindamycin 2% cream, 5 g intravaginally, at bedtime for 7 days, *or*
 Metronidazole 0.75% gel, 5 g intravaginally, once or twice daily for 5 days

Alternative regimens

Metronidazole, 2 g orally, in a single dose, *or*
 Clindamycin, 300 mg orally, twice daily for 7 days

Adapted from 1998 guidelines for treatment of sexually transmitted diseases. Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep* 1998;47(RR-1):1-111.

Trichomoniasis

Trichomoniasis can range from asymptomatic (20% to 50% of affected patients) to severe infection.²¹ It is caused by a unicellular parasite, *Trichomonas vaginalis*. Although fomite transmission may be possible, it is considered a sexually transmitted disease, and partners should be treated. Because of its association with other sexually transmitted diseases, additional counseling and screening is appropriate.

Diagnosis. A yellow-green frothy discharge is common in symptomatic patients; however, the classic punctate "strawberry cervix" is unusual. As with bacterial vaginosis,

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Table 5. Treatment Guidelines for Trichomoniasis

Recommended regimen

Metronidazole, 2 g orally, in a single dose

Alternative regimen

Metronidazole, 500 mg orally twice daily for 7 days

Recommendation for treatment failures

Re-treat with metronidazole, 500 mg orally twice daily for 7 days

If repeated failure occurs, treat with metronidazole, 2 g orally in a single dose daily for 3-5 days

If repeated failure continues, consider susceptibility testing by the CDC

Management of sex partners

Sex partners should be treated

Avoid intercourse until therapy is completed and patient and partner are asymptomatic

CDC = Centers for Disease Control and Prevention.

Adapted from 1998 guidelines for treatment of sexually transmitted diseases. Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep* 1998;47(RR-1):1-111.

vaginal pH is greater than 4.5; however, inflammation is common. The whiff-test result may or may not be positive, and a wet prep reveals abundant leukocytes as well as the trichomonad organism itself. At high power (40X), trichomonads, which are slightly larger than leukocytes, can be easily identified on the saline slide by the motion of their flagella (each having a single flagellum). It is crucial to keep the slide wet and view it immediately in order to see this activity. The wet prep shows positive results in 50% to 75% of cases,²⁰ and 70% of *Trichomonas* infections are detected on cytologic screening.

Treatment. Oral metronidazole is the mainstay of therapy for trichomoniasis, and sexual partners should be treated simultaneously (Table 5). Single dose treatment is highly effective, although it causes nausea and vomiting in 10%.²² For patients who experience these adverse effects, the 7-day alternative regimen should be prescribed. For treatment failures, retreatment with metronidazole is necessary. In cases of drug resistance, the organism should be tested in vitro for susceptibility to metronidazole. Metronidazole vaginal gel has not been found to be effective for trichomoniasis.

Atrophic Vaginitis

For most women, the normal changes that occur in the vagina in association with menopause cause no signs. Lack of estrogen causes a thinning in the epithe-

Table 6. Topical Estrogens for the Treatment of Atrophic Vaginitis

Estradiol 0.01% vaginal cream: 2-4 g daily

Conjugated estrogen vaginal cream: 2-4 g daily

Dienestrol 0.01% cream: 1-2 applicators-full daily

All regimens: use daily for 1-2 weeks, then use 3 times/week for 1-2 weeks.

lium, which becomes glycogen poor. As a consequence, the environment becomes lactobacillus poor, and pH rises to between 5.0 and 7.0. Symptomatic women will complain of dryness, burning, pruritus, dyspareunia, dysuria, and sometimes, spotting.

Diagnosis. The vagina is typically erythematous, with a loss of the normal rugal folds. There may be petechiae, and in extreme cases, vulvar atrophy. The pH will be greater than 4.5, and the KOH test result will be negative. A wet mount preparation will reveal abundant leukocytes.

Treatment. In patients without a contraindication to estrogen, it should be prescribed in a systemic or local form. Daily oral use of 0.625 mg conjugated estrogen should provide relief, as will any one of a variety of estrogen creams used topically (Table 6). In general, estrogen creams are to be used daily for 1 to 2 weeks, and then 3 times weekly for 1 to 2 weeks.

Patients with a uterus should not take unopposed estrogen in any form for more than 1 month, because of the associated increased risk of endometrial cancer. A progestational agent such as medroxyprogesterone acetate 10 mg (orally) taken daily for 14 days a month should be prescribed, or a combination estrogen-progesterone pill can be given to those choosing oral estrogen therapy.

Recurrences while the patient is on topical estrogen therapy are common, but if symptoms persist, the patient should be referred for a vulvar biopsy.¹¹ Women with vaginal spotting should be referred for evaluation even in the presence of atrophic vaginitis. Patients in whom estrogen is contraindicated should be offered a lubricant for relief of symptoms. There are several commercially available, both for daily use and specifically for use during coitus.

Non-infectious Vaginitis

Diagnosis. This is very difficult to distinguish from infectious vaginitis.⁴ Symptoms may include pruritus, burning, pain, and discharge, and upon examination, the vagina will be erythematous with or without excoriations and discharge. Vaginal pH is typically normal, as

are the results of a whiff test and KOH and saline wet mounts. A history of contact with a common irritant (eg, perfume, spermicide, or soap) or with a known allergen (eg, latex condoms or antifungal cream) helps make the diagnosis.

Treatment. The mainstay of therapy is identification and avoidance of the causative agent. Patients may benefit from sodium bicarbonate sitz baths and topical vegetable oils,⁴ as well as from oral analgesics.

DIAGNOSIS AND TREATMENT OF CERVICITIS

The two main causes of cervicitis are gonorrhea and chlamydial infections. These are the most prevalent sexually transmitted bacterial diseases, with a coinfection rate of 60%.²² Trichomonal infections may also affect the cervix.

Gonorrheal Cervicitis

Although the overall incidence of gonorrhea in the United States has decreased, in certain segments of the population it has actually increased.²³ It is most commonly diagnosed in the 15- to 29-year age group, but vaginal cultures should be performed for women with other sexually transmitted diseases, a history of unsafe sexual practices, illicit drug use, or signs or symptoms of infection on examination.

Diagnosis. Symptoms include irregular vaginal bleeding, discharge, and dysuria, with 70% to 90% of infected women having a coexisting gonorrheal urethral infection.²³ On examination, the cervix may be erythematous and friable with contact bleeding; a mucopurulent discharge is often present. An endocervical culture, performed correctly, has a sensitivity of 80% to 90%, and a concomitant rectal culture yields an even greater sensitivity.²⁴

A Gram stain of the cervical discharge will show the gram-negative intracellular diplococcus of *Neisseria gonorrhoeae* in 50% to 70% of cases, with a specificity of 97%.²³ It can, however, be rather tedious to do and requires equipment not always readily available. If gonorrhea is diagnosed in this manner, a culture should be done as well, in order to confirm the diagnosis and test for antibiotic sensitivity.

Treatment. In 20% to 40% of confirmed cases, there is a coexisting chlamydial infection,²⁵ and 50% of cases in the United States show plasmid-mediated or chromosomally mediated resistance to antibiotics.²³ Treatment is therefore always accompanied by therapy for chlamydial infection and by antibiotic susceptibility testing. Any of the treatment regimens listed in **Table 7** may be used for the treatment of gonorrheal cervicitis. All regimens will cure over 97% of uncomplicated

Table 7. Treatment Guidelines for Uncomplicated Gonococcal Infections of the Cervix, Urethra, and Rectum

Recommended regimens

Cefixime 400 mg orally in a single dose, *or*
Ceftriaxone 125 mg intramuscularly (IM) in a single dose, *or*
Ciprofloxacin 500 mg orally in a single dose, *or*
Ofloxacin 400 mg orally in a single dose

PLUS

Azithromycin 1 g orally in a single dose, *or*
Doxycycline 100 mg orally twice a day for 7 days

Alternative regimen

Spectinomycin 2 g IM in a single dose

Adapted from 1998 guidelines for treatment of sexually transmitted diseases. Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep* 1998;47(RR-1):1-111.

infections. Ceftriaxone will treat incubating syphilis as well as gonorrhea. The addition of doxycycline or azithromycin is for the coverage of chlamydial infection. The addition of 1% lidocaine without epinephrine may reduce the pain associated with the parenteral therapies. An alternative treatment, for patients who cannot tolerate penicillins or quinolones, is a single dose of spectinomycin 2 g given intramuscularly (IM). This regimen has excellent efficacy for uncomplicated cervicitis or urethritis. Routine tests of cure (ie, cultures performed following treatment) are not recommended and should be reserved for patients who are symptomatic after therapy. Treatment failures often represent reinfection. In such cases, cultures should be done again, and the patient should be retreated (with an emphasis on patient education).

All patients with gonorrheal cervicitis should be advised to (1) notify partners with whom they have had sexual contact in the previous 60 days to be examined and treated, and (2) abstain from intercourse for 7 days after therapy is started. They should be tested for syphilis, counseled regarding HIV transmission, and offered HIV testing.

Chlamydial Cervicitis

Chlamydia trachomatis is an obligate intracellular bacterium. The demographic risk factors for chlamydial and gonorrheal infections are similar, and the pathogens responsible for them should always be cultured for together. The primary site of chlamydial infection is the endocervix, although the urethra and

Table 8. Treatment Guidelines for Chlamydial Infection

Recommended regimens

Azithromycin 1 g orally in a single dose, *or*

Doxycycline 100 mg orally twice daily for 7 days

Alternative regimens

Erythromycin base 500 mg orally 4 times daily for 7 days, *or*

Erythromycin ethylsuccinate 800 mg orally 4 times daily for 7 days, *or*

Ofloxacin 300 mg orally twice daily for 7 days

Adapted from 1998 guidelines for treatment of sexually transmitted diseases. Centers for Disease Control and Prevention. *MMWR Morb Mortal Wkly Rep* 1998;47(RR-1):1-111.

Bartholin's gland may also be affected. Many women with a chlamydial infection are asymptomatic, with up to one third showing signs of infection.²²

Diagnosis. Because of the cost and difficulty of culturing the organism, non-culture techniques have been developed. Enzyme-linked immunoassay and monoclonal antibody detection systems are most commonly used, with adequate sensitivity and specificity in high-risk populations. Because patients are so often asymptomatic, chlamydial infection should be screened for in all high-risk patients, including sexually active adolescents and women 20 to 40 years of age.²⁵ It should be kept in mind when counseling patients, that the non-culture tests so commonly used are associated with a small but present false-negative and false-positive rate.

Treatment. Treatment for chlamydial infection involves one of several regimens (**Table 8**). Because azithromycin, doxycycline, and ofloxacin are equally efficacious, azithromycin should be used if compliance is in question. Erythromycin is less effective, and its use is more often accompanied by gastrointestinal side effects. Routine tests of cure are not recommended, and if performed less than 3 weeks after completion of therapy, nonculture test results may be false-positive. All patients with chlamydial cervicitis must be counseled regarding partner notification and safe sex practices. HIV and syphilis testing should be offered.

PATIENT EDUCATION

The time of diagnosis of vaginitis or cervicitis is a perfect opportunity to educate a patient on a number of concepts. Patients need to understand that the vaginal system may be disturbed by a number of factors, including antibiotics, douching, and creams. All patients with vaginitis should be warned against fre-

quent empiric self-treatment with over-the-counter medications. Those with non-sexually transmitted diseases should be educated on preventive measures, such as front-to-back wiping and avoidance of tight or occlusive clothing in the genital area, though its role in the cause of vaginitis is anecdotal. Those whose infections are sexually acquired need education on safe sex techniques and the need to have their partners treated to prevent recurrences. Also, they should undergo testing for syphilis and counseling on HIV and be offered testing.

CONCLUSION

The causes of vaginitis are numerous. A careful history and physical examination, including KOH and saline wet mounts, "whiff test," and pH measurement, should be performed in the evaluation of a woman who presents with complaints of vaginal discharge or irritation. Treatment of specific problems should be administered only after careful evaluation. The diagnosis of vaginitis and cervicitis provides an opportunity for the clinician to educate the patient regarding genital hygiene, the use of over-the-counter products, and safe-sex practices. **HP**

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