CHAPTER 98
Sexually Transmitted Diseases
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PERSPECTIVE

More than 300 million new cases of sexually transmitted diseases (STDs) are diagnosed worldwide each year. In the United States, nearly 20 million new cases of STDs are diagnosed annually, and patients with these infections frequently come to the emergency department (ED) for care.\(^1\) Because EDs often are used as a source of primary health care, their role in screening and treating STDs has been debated. One major area of difficulty in use of EDs for this purpose is that many test results are not available during the ED visit. Treatment decisions are therefore made presumptively, inevitably leading to both overtreatment and undertreatment for STDs. As evidence supporting this concern, one third of patients who test positive for STDs in the ED are not treated during the initial visit, and a majority of untreated patients do not return for subsequent treatment.\(^2\) As a result, emergency providers should weigh the cost of overtreatment against the risk of untreated disease. Because these diseases pose a significant public health risk, it is recommended that patients be treated presumptively in the ED unless good follow-up for test results can be ensured. In addition, to help contain these diseases, many states allow expedited partner therapy (EPT) or patient-delivered partner therapy (PDPT), allowing physicians to prescribe treatment not only for the patients being treated but also for their sexual partners. (Information on EPT and PDPT and the states that allow it is available on the Centers for Disease Control and Prevention [CDC] website [www.cdc.gov]).

Although patients with STDs usually have presenting complaints involving the genitalia, they may also have abdominal, dermatologic, musculoskeletal, neurologic, or systemic symptoms. Prompt and accurate diagnosis prevents both the complications and spread of these diseases.

As with most other illnesses, the history and physical examination provide much of the clinical information needed to diagnose STDs. Patients should be questioned about current and previous symptoms and their duration, as well as any previous history of STDs, recent sexual contacts, use of contraceptives (particularly barrier devices such as condoms), and types of sexual practices; women should additionally be questioned about their menstrual history. Physical examination focuses on the symptomatic area, often the genitalia. Evidence of skin lesions and their type as well as presence of discharge should be noted. Examination of the skin and lymph nodes may be an important component of the examination, particularly in the case of syphilis, gonorrhea, or chancroid. Evidence of septic arthritis on examination of symptomatic joints may indicate gonococcal arthritis and disseminated gonococcal infection (DGI).

The STDs can be divided into two broad categories: those that manifest with genital lesions, with or without adenopathy, and those that are nonulcerative, which most frequently cause genital discharge (Table 98-1).

DISORDERS CHARACTERIZED BY GENITAL LESIONS WITH OR WITHOUT ADENOPATHY

STDs are a well-recognized cause of genital lesions. It is important to note, however, that patients with a “sore” on or near the genitalia or anus may be using this term to refer to genital warts, scabies, premalignant lesions, or other conditions. If an STD is the cause, certain components of the history and physical examination can provide crucial information to help narrow the diagnosis to a specific infection (Table 98-2). The history and physical examination should focus on the characteristics of the lesion or lesions, the presence or absence of adenopathy, and the presence or absence of systemic symptoms. With regard to the lesions, it is important to determine whether they are single or multiple, painful or painless, indurated or soft; whether they have irregular or regular borders; and how they began (e.g., as a vesicle or papule). If the patient has lymphadenopathy, examination will determine if they are unilateral or bilateral and whether the nodes are painful or fluctuant.

In the evaluation of a patient with genital ulcerative lesions, herpes simplex virus (HSV) testing and syphilis serologic studies should be performed; if feasible, a darkfield examination of the lesion scrapings also is useful. In addition, patients should either be tested for or referred for human immunodeficiency virus (HIV) testing, because ulcerative genital lesions increase the risk of acquiring HIV infection.

Comprehensive test results often are not available during the patient’s ED visit; therefore treatment is considered for the most likely diagnoses based on history and physical examination findings. The most common ulcerative diseases in the United States are herpes and syphilis; herpes occurs vastly more frequently than does syphilis. In rare outbreaks, chancroid may be the cause of the ulceration.

HERPES

In the United States, genital herpes is the most common cause of ulcerative STDs, with 50 million people infected with the virus and 200,000 to 300,000 new symptomatic cases annually.\(^2\) One in five sexually active adults is infected with the virus, many of whom are asymptomatic. Most commonly caused by HSV type 2, genital herpes also can be caused by HSV-1. In pregnant patients, herpes can cause a devastating congenital infection, although the incidence of such infections has decreased. In addition, HSV infection...
plays a major role in the transmission of HIV as herpetic lesions increase the risk of both acquisition and transmission of HIV.

Clinically, genital herpes manifests as either primary herpes infection or recurrence. In primary infections the degree of illness depends on whether the patient has preexisting circulating antibodies to either HSV-1 or HSV-2; in cases of initial genital infection, those with antibodies tend to have a milder syndrome than those without. In cases of primary infection in patients without antibodies, symptoms develop after a 2- to 7-day incubation period. The syndrome begins with genital lesions that may start as vesicles and rapidly become painful, shallow, multiple, and grouped ulcers (Fig. 98-1). In women, these lesions may coalesce into large ulcerations on the perineum (Fig. 98-2). Systemic symptoms may include low-grade fever, myalgias, headache, and fatigue. Adenopathy typically develops during the second or third week of the illness and is bilateral, mildly tender, and nonfluctuant. The local symptoms peak at approximately 8 to 10 days, and it takes 2 to 4 weeks for the lesions to completely heal. Viral shedding can last as long as 3 weeks. In some cases, sacral radiculopathy may develop, with urinary retention, constipation, and sensory changes in the perineal region. Aseptic meningitis and transverse myelitis are relatively uncommon complications. In contradistinction to patients without antibodies, patients acquiring an initial herpes genital infection who have circulating antibodies to the herpesvirus have a milder course, often developing only the genital lesions.

As the symptoms of primary infection recede, the virus settles in the spinal cord ganglia and becomes latent, residing there for the lifetime of the patient. Symptomatic recurrences are the rule, occurring in 60 to 90% of patients. In contrast to the prolonged syndrome and systemic symptoms of primary infection, recurrences are much shorter in duration and tend to cause only mild local symptoms. Many patients will be warned of an impending recurrence by a prodrome, usually characterized by paresthesias, burning, or itching at the site of the subsequent lesions. Although it is known that viral shedding can occur during a recurrence, data suggest that in patients infected with HSV-2, shedding occurs during asymptomatic periods as well.

Population screening with serologic tests for HSV-2 suggests that many people become infected with the virus without symptoms or knowledge of having acquired the infection. Patients with only serologic evidence of past infection may be a potential reservoir for transmission of the virus.

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**Table 98-1** Differential Diagnosis for Sexually Transmitted Diseases

<table>
<thead>
<tr>
<th>ULCERATIVE</th>
<th>NONULCERATIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herpes genitalis</td>
<td>Gonorrhea</td>
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<tr>
<td>Syphilis (primary)</td>
<td>Chlamydial infection</td>
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<tr>
<td>Chancroid</td>
<td>Nongonococcal urethritis</td>
</tr>
<tr>
<td>Lymphogranuloma venereum</td>
<td>Secondary or tertiary syphilis</td>
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<tr>
<td>Granuloma inguinale (donovanosis)</td>
<td>Candidal vaginitis</td>
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<tr>
<td>Molluscum contagiosum</td>
<td>Trichomoniasis</td>
</tr>
<tr>
<td>Condyloma acuminata (genital warts)</td>
<td>Bacterial vaginosis</td>
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<tr>
<td>Pediculosis</td>
<td>Endometriosis</td>
</tr>
<tr>
<td>Scabies</td>
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<tr>
<td>Pyoderma</td>
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<tr>
<td>Trauma</td>
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<td>Excoriations</td>
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<tr>
<td>Behçet’s disease</td>
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<td>Fixed drug eruption</td>
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<td>Yeast infection</td>
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</tbody>
</table>

**Table 98-2** Characteristics of Ulcerative Sexually Transmitted Diseases

<table>
<thead>
<tr>
<th>DISEASE</th>
<th>NATURE OF GENITAL ULCER</th>
<th>INCUBATION PERIOD</th>
<th>PAINFUL</th>
<th>INGUINAL ADENOPATHY</th>
<th>DIAGNOSTIC TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syphilis</td>
<td>Indurated, sharply demarcated, with red, smooth base; heals spontaneously</td>
<td>9-90 days; average 2-3 weeks</td>
<td>No</td>
<td>Firm rubbery nodes; nontender</td>
<td>Darkfield examination; serology</td>
</tr>
<tr>
<td>Herpes simplex</td>
<td>Multiple small grouped vesicles on a red base, which form shallow ulcers; may coalesce; resolve spontaneously but recurrence is common</td>
<td>2-7 days</td>
<td>Yes</td>
<td>Bilateral, firm, tender</td>
<td>Culture, serology</td>
</tr>
<tr>
<td>Chancroid</td>
<td>Irregular, sharply demarcated borders with undermined edges, shallow, often multiple</td>
<td>3-6 days</td>
<td>Yes</td>
<td>Unilateral most common; overlying erythema, fixed and tender; suppuration may occur</td>
<td>Culture</td>
</tr>
<tr>
<td>Lymphogranuloma venereum</td>
<td>Usually single lesion, papule or ulcer, transient, frequently not noticed</td>
<td>5-21 days</td>
<td>No</td>
<td>Unilateral most common; firm, tender, matted, fixed; may suppurate or form fistulae</td>
<td>Lymphogranuloma venereum complement fixation (serology)</td>
</tr>
</tbody>
</table>

**Figure 98-1.** Genital herpes lesions on the penile shaft.
Diagnosis

Although the diagnosis of genital herpes usually is made clinically, this diagnostic strategy is both insensitive and nonspecific. Confirmatory testing should be strongly considered, particularly in women of childbearing age. Several methods are available, including viral culture and antigen testing of the lesions, as well as type-specific viral serologic testing of the blood; a positive result on any of these tests is considered definitive. The Tzanck test, used in the past for diagnosis of herpes infection, is no longer recommended because of its lack of sensitivity.

Although viral culture of a lesion has traditionally been the “gold standard” diagnostic modality, this test has a low sensitivity, takes 3 to 10 days to complete, and has false-negative results ranging from 5 to 20%. Polymerase chain reaction (PCR) testing for HSV DNA is more sensitive and is now the preferred method for making the diagnosis. Recently available serologic testing is type-specific, but patients with newly acquired viral infection may take up to 6 weeks to show positive antibodies. This test is most useful in patients with symptoms consistent with herpes but with negative results on culture or antigen testing. In the patient with a new presentation, PCR testing for HSV DNA is the recommended diagnostic test.

Treatment

Although genital herpes is incurable and outbreaks are self-limited, treatment decreases the duration of symptoms in patients with primary infection, can shorten or abort recurrences, and decreases the amount and duration of viral shedding and therefore potential infectivity. In patients with frequent recurrences, suppressive therapy can decrease the number of these episodes by up to 80%. The mainstay of treatment is therapy with one of the antiviral drugs acyclovir, valacyclovir, and famciclovir (Table 98-3). None of these agents can eliminate the virus, but their use can control symptoms, at least while the drug is being taken. Acyclovir has been shown to be safe for up to 6 years’ continuous use as a suppressive agent; the other antivirals have been proven safe for 1 year.

Patient education is critical in cases of genital herpes. The importance of testing the patient’s sexual partner or partners should be emphasized, and the patient should be told that he or she can potentially transmit the virus and infect a sexual partner even during asymptomatic periods. If the patient is a woman of childbearing age, she should be instructed to inform her physician of her history of genital herpes if she becomes pregnant.

Neonatal herpes is a devastating and potentially fatal infection seen most often in newborns born to women who acquired the infection near delivery, but it can also be transmitted by women with recurrences and even those who lack a history of clinically evident genital herpes. Cesarean section is the preferred method of delivery if the patient has active lesions at the time of onset of labor. Because the antiviral agents used to treat genital herpes have not been proved safe during pregnancy, the decision to use these agents should be made in conjunction with both the patient and her physician.

BARTHOLIN CYST AND ABSCESS

The Bartholin glands are located inferiorly on either side of the vaginal opening and normally secrete fluid through their openings on the sides of the vestibule. The ducts and glands are palpable or visible only when obstructed, infected, or inflamed. When the duct of the gland becomes obstructed, a simple cyst develops, which usually is painless. Patients with a Bartholin gland cyst typically report a lump at the lateral introitus, and on examination an ovoid mass can be palpated on the mucosal surface of the lateral posterior introitus, just above the posterior fourchette. Treatment usually consists of incision and drainage with local anesthesia with Word catheter placement and sitz baths. Simple packing can be used, but the cavity may need repacking multiple times as the area heals.

A Bartholin abscess develops when a Bartholin cyst becomes secondarily infected. A majority of abscesses involve the anaerobic and aerobic bacteria normally found in the vagina. However, infection may also be caused by sexually transmitted organisms such as Neisseria gonorrhoeae and Chlamydia trachomatis. Other implicated bacteria include Bacteroides species, Escherichia coli, and other gram-negative organisms. Patients with a Bartholin abscess have swelling and pain at the lower lateral vaginal opening and may report a lump or mass near the affected labium. On examination, patients may have a swollen and painful labium, and a tender, fluctuant mass can be palpated on the posterolateral margin of the vaginal vestibule. Cellulitis may be present with surrounding edema and erythema.

Treatment consists of incision and drainage, with insertion of a Word catheter. The distal end of this small catheter includes an inflatable balloon. This distal portion is placed into the incision, and the balloon is then inflated with 2 to 4 mL of water or saline. Because the catheter needs to be left in place for 6 to 8 weeks to allow epithelialization along the tract, it is preferable to make the incision on the mucosal surface of the vestibule. This location allows for the protruding portion of the catheter to be tucked into the vaginal opening for patient comfort. Although iodoform gauze can be used as a packing material, the multiple changes necessary to keep the area open during the several weeks of healing make this alternative less desirable. Although incision and drainage are adequate for most patients, management of recurrent infections may require surgical marsupialization, creating a permanent fistula that prevents recurrent abscess formation.

Patients are instructed to start sitz baths within 24 hours of ED discharge to promote drainage. Patients should be referred for follow-up for reexamination of the wound within 48 hours. Because some Bartholin abscesses are caused by multiple organisms, abscess drainage should be cultured and routine testing for STDs performed. Antibiotics usually are not necessary unless...
### Table 98-3  Treatment Guidelines for Sexually Transmitted Diseases

<table>
<thead>
<tr>
<th>DISEASE</th>
<th>RECOMMENDED TREATMENT REGIMEN</th>
<th>ALTERNATIVE(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlamydial infection</td>
<td>Azithromycin 1 g PO × 1 or</td>
<td>Erythromycin base 500 mg PO qid × 7 days or</td>
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<tr>
<td></td>
<td>Doxycycline 100 mg PO bid × 7 days</td>
<td>Erythromycin ethylsuccinate 800 mg PO qid × 7 days</td>
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<td></td>
<td></td>
<td>Ofloxacin 300 mg PO bid × 7 days or</td>
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<td></td>
<td></td>
<td>Levofloxacin 500 mg PO qd × 7 days</td>
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<tr>
<td>Gonorrhea,* uncomplicated urethral, cervical, or rectal infection</td>
<td>Ceftriaxone 250 mg IM × 1 plus</td>
<td>May substitute azithromycin with doxycycline</td>
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<tr>
<td></td>
<td>Azithromycin 1 g PO once</td>
<td>100 mg PO daily for 7 days</td>
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<tr>
<td>Gonorrhea,* pharyngeal</td>
<td>Ceftriaxone 250 mg IM × 1 plus</td>
<td>May substitute azithromycin with doxycycline</td>
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<tr>
<td></td>
<td>Azithromycin 1 g PO once</td>
<td>100 mg PO daily for 7 days</td>
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<tr>
<td>Gonorrhea,* adult conjunctivitis</td>
<td>Ceftriaxone 1 g IM × 1 Normal saline irrigation</td>
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<td></td>
<td>Consider hospitalization</td>
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<tr>
<td>Gonorrhea,* disseminated infection</td>
<td>Ceftriaxone 1 g IM or IV every 24 hours</td>
<td>Cefotaxime 1 g IV q8h or</td>
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<tr>
<td></td>
<td>Strongly consider hospitalization</td>
<td>Ceftriaxone 1 g IV q8h</td>
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<tr>
<td>Syphilis; primary, secondary or early latent</td>
<td>Benzathine penicillin G 2.4 million units IM single dose</td>
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<tr>
<td>Syphilis, late latent</td>
<td>Benzathine penicillin G 2.4 million units IM in three doses, 1 week apart</td>
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<tr>
<td>Herpes simplex, first episode</td>
<td>Acyclovir 400 mg PO tid × 7-10 days or</td>
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<td></td>
<td>Acyclovir 200 mg PO 5x/day × 7-10 days or</td>
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<td></td>
<td>Famciclovir 250 mg PO tid × 7-10 days or</td>
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<td></td>
<td>Valacyclovir 1 g PO bid × 7-10 days</td>
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<tr>
<td>Herpes simplex, recurrent</td>
<td>Acyclovir 400 mg PO tid × 3 days or</td>
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<td></td>
<td>Acyclovir 800 mg PO bid × 5 days or</td>
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<td></td>
<td>Acyclovir 800 mg PO tid × 2 days or</td>
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<td></td>
<td>Famciclovir 125 mg PO bid × 5 days or</td>
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<td></td>
<td>Famciclovir 1000 mg PO bid × 1 day or</td>
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<td></td>
<td>Famciclovir 500 mg PO once, then 250 mg PO bid for 2 days or</td>
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<td></td>
<td>Valacyclovir 1 g PO qd × 3 days or</td>
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<td></td>
<td>Valacyclovir 500 mg PO bid × 3 days</td>
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<td>Valacyclovir 1 g PO bid</td>
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<td>Famciclovir 250 mg PO bid</td>
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<td>Valacyclovir 500 mg PO qd</td>
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<td>Valacyclovir 1 g PO qd</td>
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<td>Acyclovir 400 mg PO bid or</td>
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<td></td>
<td>Famciclovir 250 mg PO bid</td>
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<td>Valacyclovir 500 mg PO qd or</td>
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<td>Valacyclovir 1 g PO qd</td>
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<tr>
<td>Herpes simplex, suppressive</td>
<td>Acyclovir 400 mg PO bid or</td>
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<td></td>
<td>Famciclovir 250 mg PO bid</td>
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<td></td>
<td>Valacyclovir 500 mg PO qd</td>
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<td>Valacyclovir 1 g PO qd</td>
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<tr>
<td>Chancroid</td>
<td>Azithromycin 1 g PO once or</td>
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<td></td>
<td>Ceftriaxone 250 mg IM once or</td>
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<td></td>
<td>Ciprofloxacin 500 mg PO bid × 3 days or</td>
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<td></td>
<td>Erythromycin base 500 mg PO tid × 7 days</td>
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<td></td>
<td>Valacyclovir 1 g PO qd</td>
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<td></td>
<td>Valacyclovir 1 g PO bid or</td>
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<td></td>
<td>Famciclovir 250 mg PO bid or</td>
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<td></td>
<td>Valacyclovir 1 g PO qd</td>
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<td></td>
</tr>
<tr>
<td>Lymphogranuloma venereum</td>
<td>Doxycycline 100 mg PO bid × 21 days</td>
<td>Erythromycin base 500 mg PO qid × 21 days</td>
</tr>
</tbody>
</table>

*IM, intramuscularly; IV, intravenously; PO, orally.

* Because of resistance, quinolones are no longer recommended for the treatment of gonorrhea. Also, recent increases in cephalosporin resistance led to the removal of the previously recommended cefixime as treatment for uncomplicated gonorrhea.

significant surrounding cellulitis is present. If deemed necessary, patients should be treated with appropriate antibiotic therapy to cover coliforms as well as sexually transmitted infections, including *Chlamydia* and *N. gonorrhoeae*.

### SYPHILIS

Syphilis, known as the “Great Imitator,” is caused by the spirochete *Treponema pallidum* and earns its nickname from its ability to infect virtually any organ of the body and cause multiple symptoms.

The organism is fragile and does not survive on dry surfaces. Transmission occurs during exposure of moist skin to an infected area. Although transmission usually involves the genitalia, inoculation can occur virtually anywhere on the body. The incidence of primary and secondary syphilis in the United States hovers between 7000 and 10,000 cases per year.7 If untreated, syphilis typically progresses through several stages, as follows.

1. **Primary.** The primary lesion, called a chancre, occurs after an incubation period that varies from 9 to 90 days, averaging 2 to 4 weeks. This lesion occurs at the site of inoculation and begins as a papule that then ulcerates. Typically the chancre is solitary and painless and has a smooth, slightly raised edge, with sharply defined borders and a clean base (Fig. 98-3); occasionally patients have more than one lesion (Fig. 98-4). Without treatment the chancre lasts for 2 to 6 weeks and resolves spontaneously, and the disease then progresses to the secondary stage. Adenopathy is not a predominant feature of primary
begins on the trunk as a fine macular rash, which then spreads outward to the arms and legs and may involve the palms and soles (Fig. 98-6). As it progresses, it becomes papulosquamous and may appear slightly annular, often resembling the rash of pityriasis rosea. Mucous patches can be seen on the tongue, which are the oral manifestations of the skin rash. Condylomata lata (Fig. 98-7) can also develop; these lesions are broad-based papules with flat moist tops, occurring in the perineal region, and may involve the anus, the skin between the buttocks, and the labia. Constitutional signs and symptoms are common during this stage, including fatigue, low-grade fever, malaise, headache, arthralgias,
and generalized lymphadenopathy. Adenopathy may occur virtually anywhere in the body, including epitrochlear node involvement. The nodes are discrete, nontender, and rubbery. As with the primary stage, the manifestations of secondary syphilis will resolve spontaneously if the condition goes untreated, and the infection then enters the latent or tertiary stage.

3. Latent. After resolution of the clinical manifestations of secondary syphilis, patients enter the latent phase, which is defined as seroreactivity for syphilis without evidence of disease. As there are no clinical signs and symptoms during this stage, laboratory testing is the only means to identify infected persons. Latent syphilis is divided into two categories: early latent syphilis, acquired within the preceding year, and late latent syphilis, the designation for all other cases of latent syphilis or for latent syphilis of unknown duration.

4. Tertiary. In the immunocompetent individual, signs and symptoms of tertiary syphilis may appear after a latent period of at least 3 to 4 years. This stage predominantly involves the cardiovascular and nervous systems. Presenting conditions may include a thoracic aortic aneurysm, meningitis, peripheral neuropathy (tabes dorsalis), or gummatous lesions of the mucous membranes. Although common in the preantibiotic era, tertiary syphilis is now uncommon in the United States.

**Diagnosis**

The only rapid means of diagnosing syphilis is the darkfield examination. This method involves viewing scrapings or fluid from primary or secondary syphilis lesions under a darkfield microscope to identify the spirochete. Unfortunately, the sensitivity of darkfield microscopy is approximately 80%, and many hospitals and clinics do not have this technique routinely available.

Serologic testing is the current standard for diagnosing secondary, latent, and tertiary syphilis. In primary syphilis, one-time testing is less reliable, and follow-up testing may be necessary to confirm the diagnosis. There are two types of serologic tests: nontreponemal—the Venereal Disease Research Laboratory (VDRL) and rapid plasma reagin (RPR) tests—and treponemal—microhemagglutination assay for T. pallidum (MHA-TP) and fluorescent treponemal antibody absorption (FTA-ABS) test. Both types of tests are necessary for definitive diagnosis, although the nontreponemal test is used for screening, with treponemal testing used for confirmation. Nontreponemal tests measure nonspecific antibodies in serum from patients with syphilis, and the titers tend to vary with the stage and activity of disease. These tests involve quantitative measurement of antibody and become positive approximately 2 weeks after the primary chancre appears. Titers are used to follow response to treatment. Because these tests are nonspecific for the treponeme and false-positive results can occur, positive test results should be confirmed with the more specific treponemal tests. Treponemal tests measure antibodies specific to the spirochete T. pallidum. These tests are more expensive and difficult to perform than the nontreponemal tests, and because their titers do not predictably vary with treatment, the main value of these tests is in confirming positive findings on nontreponemal tests.

**Treatment**

A one-time dose of the long-acting formulation of penicillin G benzathine, 2.4 million units intramuscularly (IM), is the regimen of choice for treating primary and secondary syphilis (see Table 98-3 for treatment of latent and tertiary syphilis). It is crucial that the long-acting form of penicillin G benzathine be used; the half-life of an alternative preparation comprising both penicillin G benzathine and penicillin G procaine (i.e., Bicillin C-R) is too short, which has resulted in treatment failures. Sexual partners need to be evaluated; partners within the last 90 days should be tested but treated presumptively, and partners from more than 90 days before diagnosis should be evaluated and treated if indicated. Because syphilis increases the risk of acquisition of HIV, all patients should be referred for HIV testing. For response to treatment to be ensured, patients should be reexamined clinically and serologically 6 and 12 months after treatment. Successful treatment is confirmed by either a nonreactive nontreponemal test or a fourfold or greater decrease in titers after 6 months. Because syphilis is a reportable disease, patients with positive test results should be reported to the public health department.

Because congenital syphilis can be devastating, pregnant patients with syphilis pose a unique and significant concern. Parenteral penicillin G is the only agent with documented efficacy in these instances. Therefore in pregnant women with a reported penicillin allergy who have syphilis at any stage, treatment with penicillin is still recommended after desensitization.

**LYMFOGRANULOMA VENEREUM**

Lymphogranuloma venereum (LGV) is a chronic STD caused by specific serotypes of C. trachomatis. Although this disease is prevalent in many tropical countries, it is rare in the United States and is seen either in patients who have traveled to endemic areas or in localized outbreaks in patient populations such as men who have sex with men. The incubation period ranges from 3 days to 3 weeks. In cases of genital exposure, the initial infection manifests as a transient genital lesion that is small and painless and often goes unnoticed by the patient. Patients typically are seen in the secondary stage with lymphadenitis, characterized by involvement of the lymphatic channels and nodes of the genitalia, pelvis, and rectum. This lymphadenitis begins at 7 to 30 days after the primary lesion disappears. Inguinal lymphadenopathy most often is unilateral, and enlargement of the glands above and below Poupart’s ligament gives the characteristic LGV “groove sign.” The enlarged nodes often are painful, with overlying erythema, but usually are not fluctuant or at most are minimally so. The nodes either eventually break down, with the formation of multiple draining sinuses, or form a hard inguinal mass without suppuration. The late complication of distal lymphedema results from the blockage of lymphatic channels.

Patients with rectal exposure may have proctocolitis, manifesting with mucoid and/or hemorrhagic rectal discharge with anal pain, fever, constipation, and/or tenesmus. Untreated, these patients may develop colorectal fistulae and strictures.

**Diagnosis**

Although serologic testing is available, the diagnosis of LGV is usually based on the clinical picture, epidemiologic information, and the exclusion of other causes of inguinal lymphadenopathy and genital ulcers.

**Treatment**

Treatment is curative and is crucial to prevent permanent tissue damage. The preferred treatment is with doxycycline, 100 mg orally (PO) twice daily for 21 days; erythromycin base 500 mg PO four times daily for 21 days is an alternative regimen. Patients should refer their sexual partners from within the previous 60 days for evaluation and treatment, and all patients should be referred for HIV testing.
**CHANCROID**

Chancroid is caused by *Haemophilus ducreyi*, a small gram-negative bacterium. This disease is common in developing countries but rare in the United States, with usually less than 100 cases reported annually to the CDC. Despite being relatively rare, outbreaks of chancroid have been reported in the United States, and physicians should be aware of the characteristics of this disease to permit recognition of these occasional outbreaks when they occur.

Clinically, chancroid is characterized by multiple painful genital ulcerations and inguinal bubo formation (Fig. 98-8). After an incubation period of less than 1 week, a short-lived, small, tender red papule appears at the site of inoculation. This lesion rapidly ulcerates, followed by the formation of multiple shallow, painful ulcers with sharply demarcated edges and purulent bases. These lesions last 1 to 2 weeks, and in some patients they may coalesce. Inguinal lymph node involvement is seen in 50% of patients, manifesting 1 week after the ulcers appear. Typically, a unilateral large, painful, fluctuant lymph node (bubo) develops in the groin. Overlying skin is thinned and erythematous, and suppuration is common. These buboes can spontaneously rupture.

On a clinical basis, it may be difficult to distinguish chancroid from genital herpes. The presence of a large, fluctuant bubo strongly suggests chancroid. However, if only ulcers are present, the patient can have either disease. Because herpes is several orders of magnitude more common in the United States than chancroid (which tends to occur in isolated outbreaks), herpes is the first diagnosis to be considered.

**Diagnosis**

*H. ducreyi* is difficult to culture, so the diagnosis is based on clinical presentation and often is one of exclusion, after other diseases such as herpes and syphilis have been ruled out by testing. Definitive diagnosis requires isolation and identification of *H. ducreyi*, a fastidious organism requiring a special growth medium that is not routinely available. Because definitive diagnosis can be elusive, a “probable diagnosis” can be made if all of the following criteria are met: (1) The patient has one or more painful genital ulcers; (2) the patient has no evidence of *T. pallidium* infection on dark-field examination or serologic testing at least 7 days after onset of the ulcers; (3) the clinical presentation, appearance of genital ulcers, and, if present, regional lymphadenopathy are typical for chancroid; and (4) results of HSV testing performed on the ulcer exudates are negative. When local outbreaks are known, the microbiology laboratory can prepare the special medium required for growth of the organism to confirm specific cases, as well as to follow containment of the infection.

Any of the following four curative treatment regimens may be used: a single dose of azithromycin 1 g PO, a single dose of ceftriaxone 250 mg IM, ciprofloxacin 500 mg PO twice daily for 3 days, and erythromycin base 500 mg PO three times daily for 7 days (see Table 98-3). Coinfection with syphilis or HSV occurs in approximately 10% of patients who have chancroid acquired in the United States, so patients should be evaluated for these infections. Because chancroid is associated with increased risk of HIV transmission, all patients should be referred for HIV and other STD testing. Sexual partners of patients with chancroid should be examined and treated if sexual contact with the patient occurred during the 10 days preceding the patient’s onset of symptoms, even if the partners are asymptomatic. To confirm response to treatment, patients should be referred for reexamination 3 to 7 days after initiation of therapy.

Drainage of buboes is not routinely recommended because appropriate antibiotic treatment typically results in a good clinical response. If deemed necessary, needle aspiration of nodes in the superior cephalic aspect of the fluctuant area can be performed; respiration usually is usually not necessary because the adenopathy responds quickly to antimicrobial treatment. On rare occasions, incision and drainage may be necessary.

**GRANULOMA INGUINALE**

Granuloma inguinale (donovanosis) is caused by *Klebsiella granulomatis* (formerly known as *Calymmatobacterium granulomatis*), an intracellular gram-negative rod. The disease is rare in developed countries but is endemic in tropical and semitropical regions, including India, Papua New Guinea, central Australia, the Caribbean, and southern Africa. The disease is presumed to be sexually transmitted, with an incubation period of 8 to 80 days.

Clinically, the disease manifests as chronic, painless, progressive ulcerative lesions on the genitalia or perineum. The lesions are irregular, clean-based granulomatous ulcers that are highly vascular (giving the classic “beefy red appearance”) and bleed easily on contact. The ulcer feels hard when palpated. Regional lymphadenopathy does not occur. As the lesion enlarges, it can be quite mutilating to the genitalia, causing urethral stenosis over a period of months to years. Without adequate treatment, it may result in lymphatic obstruction, producing genital edema and eventually lower extremity elephantiasis. In men the sites of predilection are the prepuce, the coronal sulcus, and the frenulum. In women, lesions typically are found on the labia, but vaginal and cervical lesions also can occur.

Diagnosis is difficult and requires identification of the infectious agent, which appears as short, pleomorphic rods with bipolar staining. Donovan bodies may be seen within histiocytes on microscopy of tissue crush preparation or biopsy specimen. The causative organism is very difficult to culture, so visualization of the organism with appropriate staining is the primary means of diagnosing the disease.

Treatment halts progression of the lesions, but relapse can occur 6 to 18 months after apparently successful treatment. The CDC-recommended regimen is doxycycline 100 mg PO twice daily for at least 3 weeks or until the lesions have healed. Alternative regimens include azithromycin 1 g PO once a week, ciprofloxacin 750 mg PO twice a day, erythromycin base 500 mg PO four times daily, and trimethoprim-sulfamethoxazole, one double-strength (160 mg/800 mg) tablet PO twice daily; each regimen should be continued for 3 weeks or until the lesions have healed.

Clinical follow-up visits are recommended until signs and symptoms have resolved. Persons who have had sexual contact with the patient within 60 days of symptom onset should be examined and offered therapy. Patients should be screened for other STDs.
Anogenital warts are caused by the human papillomavirus (HPV), and more than 40 types of HPV can infect the genital tract. HPV infections most often are sexually transmitted, and lesions are most common at the site of greatest trauma during sexual intercourse. Most cases of HPV infection are asymptomatic or subclinical, with only approximately 1% resulting in clinically apparent warts. Most visible genital warts are caused by HPV types 6 and 11 and are benign. Other HPV types (i.e., 16 and 18) have been associated with external genital squamous intraepithelial neoplasia in both men and women and are considered to be the cause of most cases of cervical cancer.

In clinically apparent cases, warts may be single or multiple (Fig. 98-9). Warts on warm, moist, nonhairy skin tend to be soft and nonkeratinized, whereas those on dry, hairy skin are more firm and keratinized. The lesions can be broad based, pedunculated, or pigmented. Depending on the size and location, warts can be asymptomatic or painful, friable, or pruritic. Warts that are indurated, fixed, ulcerated, and darkly pigmented may require biopsy to rule out carcinoma.

Diagnosis usually is made clinically by visual inspection. In women, a speculum examination is indicated to evaluate the patient for intravaginal and cervical lesions. Occasionally, HPV infections may be confused with the condylomata lata of syphilis. If there is any doubt about the diagnosis, or if warts have high-risk characteristics, biopsy and darkfield microscopy of tissue are indicated, along with serologic testing for syphilis.

Treatment is aimed at removal of symptomatic warts. Although wart-free periods may be achieved, treatment has not been shown to affect the course of disease or to reduce infectivity. If left untreated, visible genital warts may resolve spontaneously, remain unchanged, or increase in number.

Many treatment options are available, although no specific treatment has been proved to be superior to another; all have significant failure and recurrence rates. For patient-applied regimens, the patient should be able to identify and reach the warts to be treated with these methods. Provider-administered regimens often require ongoing treatments on a weekly basis and usually are best administered by a primary care physician, who can monitor the patient’s response to therapy. In general, warts located on moist surfaces respond better to topical treatments than do the keratinized warts found on drier surfaces. Patients should be instructed to watch for recurrences, which are most common in the first 3 months after treatment.

Patient preference, available resources, and physician experience should guide treatment. Most of these treatments are administered by the patient’s primary care physician and not through the ED. Regimens can be divided into patient-applied and provider-administered treatments.

**Patient-applied** regimens include the following:
- Podophyllin 0.5% solution or gel, applied twice a day for 3 days, followed by 4 days of no therapy—which may be repeated, as necessary, for up to four cycles.
- Imiquimod 5% cream, applied once daily at bedtime, three times a week for up to 16 weeks. The treatment area should be washed with soap and water 6 to 10 hours after application.
- Sinecatechins 15% ointment, applied three times daily with a finger to ensure complete wart coverage with a thin layer of ointment; the ointment is not washed off. Treatment is continued until complete clearance of warts has been achieved, but no longer than 16 weeks.

**Provider-administered** regimens include the following:
- Cryotherapy with liquid nitrogen or cryoprobe, which may need to be repeated every 1 to 2 weeks
- Podophyllin resin, 10 to 25% in a compound tincture of benzoin
- Trichloroacetic acid (TCA) or bichloroacetic acid (BCA), 80 to 90%
- Surgical removal

Podophyllin and podophyllum resin should be avoided in pregnant patients because of possible teratogenic effects. Imiquimod also is not approved for use during pregnancy. Immunosuppressed patients are more likely to demonstrate a poor response to treatment, increased relapse rates, and dysplasia and need close follow-up. All patients need screening for other sexually transmitted infections. Treatment of partners is not necessary.

In 2006 the U.S. Food and Drug Administration (FDA) licensed the HPV vaccine, which covers the four virus types that are responsible for 70% of cases of cervical cancer and 90% of anogenital warts. The vaccine is virtually 100% effective if administered before first sexual contact. Currently the vaccine is recommended for males aged 9 to 26 years to prevent genital warts and for females aged 11 and 12 years and those aged 13 to 26 years who were not fully vaccinated when they were younger.

**MOLLUSCUM CONTAGIOSUM**

Molluscum contagiosum is a condition characterized by multiple rounded, domed, waxy papules ranging from 2 to 5 mm in size that are often umbilicated. They are caused by a benign virus inoculated on the skin. In adults the virus is commonly sexually transmitted and causes few lesions, often limited to the perineum, genitalia, lower abdomen, or buttocks. It is usually a self-limiting disease in healthy adults and rarely needs specific treatment.

**DISORDERS CHARACTERIZED BY GENITAL DISCHARGE**

Patients with diseases that fall into the group of disorders characterized by genital discharge tend to have urethral or vaginal discharge and do not have ulcerations or significant lymphadenopathy. These infections include chlamydial infection,
gonorrhea, nongonococcal urethritis, trichomoniasis, bacterial vaginosis, candidiasis, and pelvic inflammatory disease (PID). Bacterial vaginosis and candidiasis are not typically considered to be sexually transmitted conditions but often are diagnosed in patients undergoing evaluation for STDs. Chlamydial infection and gonorrhea can also cause vaginal discharge, especially in the setting of mucopurulent cervicitis, and both tend to cause urethral discharge in men. These two organisms commonly cause coinfections, and clinical manifestations of these two infections are similar. It is usually not possible to distinguish between the two diseases on the basis of signs and symptoms alone, and patients often are appropriately treated presumptively for both infections (see Table 98-1).

CHLAMYDIAL INFECTION

In the United States, chlamydial infection is diagnosed in more than 1 million people annually, making it the most commonly reported STD. The causative organism is *C. trachomatis*, an obligate intracellular organism that infects columnar and pseudostratified columnar epithelial cells. Although infection with *C. trachomatis* can cause a variety of symptoms, including urethritis, cervicitis, epididymitis, proctitis, prostatitis, PID, and perihepatitis (also known as Fitz-Hugh–Curtis syndrome), asymptomatic infection is common.

Symptoms appear after an incubation period of 1 to 3 weeks. Although urethritis is the most common manifestation in men, men also can have epididymitis, or both in combination. When symptomatic, women may report symptoms and signs ranging from dysuria to systemic illness related to peritonitis. Often, however, the presenting manifestations in women are vague and nonspecific: dyspareunia, vaginal discharge or bleeding, or abdominal or pelvic pain, or some combination thereof. Unfortunately, infection is commonly asymptomatic; estimates show that up to 75% of infected women and 50% of infected men have no symptoms. The highest rate of infection is in sexually active adolescent females, with infection rates as high as 10% in this group. Of note, PID, with its increased risk of subsequent ectopic pregnancy and infertility, develops in up to 40% of women with untreated chlamydial infection. Because of the high rate of asymptomatic infection and the increased risk for development of PID and its sequelae after chlamydial infection, screening of high-risk patients (e.g., those with multiple sexual partners) for disease may be appropriate in the ED, as long as adequate follow-up is ensured. The CDC recommends *Chlamydia* testing for all women 25 years of age or younger, for older women with risk factors (a new sexual partner or multiple sexual partners), and for all pregnant patients.

In the past the gold standard modality for diagnosing chlamydial infection was cell culture, but it has fallen out of favor as it is labor-intensive, it is fraught with difficulties, and definitive results take days. Although other nonculture techniques (DNA probe and latex agglutination testing) have been used since the 1990s to make the diagnosis of chlamydial infection, the high sensitivity and specificity of nucleic acid amplification techniques (NAATs) has made them the diagnostic methods of choice. All of these techniques amplify nucleic acid sequences specific to the organism being tested and do not require viable organisms. NAATs have sensitivity rates better than those for culture (greater than 90%, versus 60-80%), with specificity greater than 99%, and they are more sensitive than other nonculture tests (DNA probe testing, latex agglutination testing). NAATs can be performed on swabs (endocervical or urethral) and urine. Urine screening with NAATs is adequate for symptomatic male patients, and urethral swabs generally are not necessary; either vaginal or urine specimens are adequate for testing in women.

Treatment of chlamydial infection consists of azithromycin 1 g PO in a single dose or doxycycline 100 mg PO twice daily for 7 days. Coinfection with gonorrhea is common, so unless gonorrhea is definitively ruled out, patients should be treated for both infections. Patients should be instructed to abstain from sexual intercourse for 7 days after completion of treatment (either single-dose therapy or the 7-day regimen of doxycycline). Sexual partners within the previous 60 days (and, if the last sexual encounter was more than 60 days before symptom onset, the most recent sexually partner) need to be evaluated, tested, and treated, and the index patient also should be instructed to abstain from sexual intercourse until all partners have been treated. Follow-up testing for cure is not required unless symptoms persist or reinfection is suspected.

NONGONOCOCCAL URETHRITIS

Nongonococcal urethritis is characterized by urethral discharge, dysuria, or urethral pruritus and, although most commonly diagnosed in men, also can be seen in women. Although the condition is often caused by *C. trachomatis* or *N. gonorrhoeae*, other organisms such as *Mycoplasma* and *Ureaplasma* also may be causative agents. All patients with suggestive symptoms should be evaluated for both gonorrhea and chlamydial infection with NAATs. The diagnosis is confirmed by Gram’s stain (more than five white blood cells [WBCs] per high-power field and no gram-negative diplococci), a positive result on the leukocyte esterase test on urinalysis, or more than 10 WBCs per high-power field on urinalysis.

Treatment consists of azithromycin 1 g PO in a single dose or doxycycline 100 mg PO twice daily for 7 days. In women with dysuria, other causes or coinfections should be ruled out, including chlamydial infection, trichomoniasis, and candidiasis. Patients with persistent symptoms despite adequate initial therapy (appropriate regimen and completion of treatment course) should be reevaluated for the accuracy of diagnosis. If the diagnosis was accurate, the patient should be treated with metronidazole 2 g in a single dose or tinidazole 2 g in a single dose; azithromycin 1 g as a single dose should be added if it was not used in the first treatment regimen.

GONORRHEA

After chlamydial infections, gonorrhea is the second most frequently reported STD, with an estimated 300,000 new *N. gonorrhoeae* infections in the United States each year. Because infection involves columnar or transitional epithelium, this organism can affect the urethra, rectum, cervical canal, pharynx, upper female genital tract, and conjunctival sac.

The most common clinical presentation in men is acute urethritis, characterized by dysuria and a penile discharge (Fig. 98-10) starting within 1 to 14 days of exposure. On examination, findings may include urethral meatal erythema and a purulent urethral discharge. Men may also have epididymitis, although this is uncommon.

In women, primary infections are often asymptomatic or produce only vague symptoms, such as vaginal discharge, abnormal vaginal bleeding, abdominal or pelvic pain, dyspareunia or dysuria, and frequency. Patients may not seek treatment until after the emergence of complications such as PID, which develops in up to 20% of women with untreated gonorrhea. Like chlamydial infection, symptomatic and asymptomatic gonococcal infection can cause PID with consequent tubal scarring that may lead to infertility or ectopic pregnancy.

Gonorrhea also can involve the oropharynx and the anorectal area. Gonococcal infection of the pharynx often is asymptomatic, but in symptomatic cases, patients develop sore throat and
and is painful on range-of-motion testing. Other manifestations involved joint is erythematous and warm, often has an effusion, elbows, ankles, wrists, and small joints of the hands and feet. The arthralgias. The knees are most commonly involved, followed by

ment, the second most common manifestation of DGI, manifests as necrotic pustules on an erythematous base and are tender to palpation. These lesions represent the consequence of septic involvement or, in severe cases, gonococcal endophthalmitis and globe perforation.

Gonococcal conjunctivitis can be a sight-threatening infection, so recognition of this form of infection is crucial. This infection can occur in newborns, in whom it is acquired during passage through an infected birth canal, and in adults, who often acquire the infection by direct inoculation from organisms on the fingers and then rubbed onto the eye. Symptomatic conjunctivitis is characterized by beefy red conjunctiva, chemosis, and purulent eye discharge that may be copious. If untreated, it can progress to corneal ulceration or, in severe cases, gonococcal endophthalmitis and globe perforation.

Figure 98-10. Purulent urethral discharge in a patient with gonorrhea.

DGI results from gonococcal bacteremia and occurs more frequently in women than in men. Typically, it manifests as the arthritis-dermatitis syndrome, characterized by a combination of any or all of the following: fevers, chills, monoarticular or oligoarticular arthritis or arthralgias, rash, and tenosynovitis. The rash of DGI consists of petechial or pustular acral skin lesions, usually found peripherally on the extremities. The lesions are described as necrotic pustules on an erythematous base and are tender to palpation. These lesions represent the consequence of septic emboli to small blood vessels during bacteremia. Joint involvement, the second most common manifestation of DGI, manifests with an acute monoarticular or oligoarticular septic arthritis or arthralgias. The knees are most commonly involved, followed by elbows, ankles, wrists, and small joints of the hands and feet. The involved joint is erythematous and warm, often has an effusion, and is painful on range-of-motion testing. Other manifestations of DGI, which are rare, include hepatitis, myocarditis, endocarditis, and meningitis.

Definitive diagnosis of DGI is confirmed by isolating gonococci from the blood, synovial fluid, or infected skin; unfortunately, cultures from these sites have relatively poor sensitivity. Presumptive diagnosis of DGI is based on the appropriate clinical presentation, plus isolation of gonococci from a source site.

**Diagnosis**

Diagnostic tests for gonorrhea include Gram staining, culture, and NAATs. Gram staining is most useful in symptomatic men with urethritis and in patients with gonococcal conjunctivitis. In these cases it is an excellent diagnostic test, with a sensitivity and specificity approaching 100%, and results are available rapidly.

Culture for *N. gonorrhoeae* can be used to isolate the organism for antimicrobial testing and determination of antibiotic sensitivities, and is useful in areas of rapidly emerging resistance. The sensitivity of this test may be significantly decreased by improper specimen collection and handling. For the yield of gonococcal culture to be maximized, inoculation of the specimen immediately after collection directly onto the appropriate medium optimizes viability of the organisms. If the specimen is from a sterile site, such as cerebrospinal fluid or synovial fluid, a nonselective medium such as chocolate agar is best. Specimens from nonsterile sites such as the cervix, urethra, rectum, or oropharynx, where normal bacterial flora is present, should be inoculated on selective media such as Martin-Lewis agar. If not transported immediately to the laboratory, specimens should be incubated at 35 to 36.5°C in a carbon dioxide–enriched atmosphere after collection and transported to the laboratory in a carbon dioxide–enriched atmosphere.

NAATs have good sensitivity and excellent specificity for detection of gonorrhea from endocervical, urethral, and urine samples. These tests are approved by the FDA for the detection of *N. gonorrhoeae* in endocervical swabs from women, urethral swabs from men, and urine from both men and women. The sensitivities of NAATs are superior to those of culture but may vary by type of NAAT.

Although NAATs are useful for diagnosis of cervical and urethral gonorrhea, they have not been cleared by the FDA for diagnosis of gonorrheal infection of the rectum, pharynx, or conjunctiva or from synovial fluid and cerebrospinal fluid; culture is required for diagnosis of organisms from these sites. In addition, culture is the diagnostic method of choice if it is necessary to determine the organism's sensitivity to specific antibiotics.

**Treatment**

The ability of *N. gonorrhoeae* to develop antimicrobial resistance is closely monitored by the CDC's Gonococcal Isolate Surveillance Project (GISP). In 2007, quinolone resistance increased to the point that these agents can no longer be used to treat gonococcal infections in the United States. In 2011, increasing resistance to cephalosporins led to a change in recommended therapy for uncomplicated gonococcal infections (see Table 98-3). In particular, the current recommendation is a two-drug regimen of ceftriaxone 250 mg IM once plus azithromycin 1 g PO as a single dose. Use of ceftriaxone is discouraged owing to increasing resistance to this agent, and azithromycin is recommended over doxycycline. This combined regimen will also treat coinfection with *Chlamydia*.

Sexual partners (those within the previous 60 days or, if the last sexual encounter was more than 60 days before onset of symptoms, the last sexual partner) need referral for evaluation, testing, and treatment. Patients should be instructed to avoid sexual activity until therapy has been completed and until they and their
partners are no longer symptomatic. Referral for HIV testing should be offered.

**TRICHOMONIASIS**

Trichomoniasis is caused by *Trichomonas vaginalis*, a flagellated protozoan. It is the most common nonviral STD in the world. As with other vaginal infections, up to 50% of infected women are asymptomatic. The most common presenting signs and symptoms include dysuria, vulvar irritation or itching, and vaginal discharge, often described as thin, malodorous, and yellow-green (Table 98-4). Affected patients also may report lower abdominal pain or discomfort and dyspareunia. Males are frequently asymptomatic and most often are seen as partners of infected women.

On physical examination, vaginal discharge is noted in up to 70% of patients, ranging in character from thin and scanty to the classic description of thick, frothy, and yellow. Vaginal pH is above 4.5. Punctate mucosal hemorrhages of the cervix ("strawberry cervix") have been described in 2 to 10% of patients. However, the history and physical examination findings are not sensitive or specific enough to make the diagnosis on clinical grounds alone, and testing is indicated.

The diagnosis most often is made by microscopic examination of a wet mount slide, but this method has a sensitivity of only 60 to 70%; sensitivity varies with the skill and thoroughness of the examiner and is optimized by examination of the slide soon after specimen collection. Culture is more sensitive than wet mount but is not widely performed, and culture results are not available in a timely manner for ED diagnosis and treatment. In men, urine sediment can be examined for trichomonads and also can be sent for culture. PCR assay is an alternate method for diagnosis of trichomoniasis. Several PCR primers have been studied, and each has demonstrated higher sensitivity than wet mount or culture. PCR assay also has been found to be highly specific, exceeding 95%. PCR testing is now available for combined point-of-care testing for *Trichomonas* along with gonorrhea and *Chlamydia*.

Either of two single-dose treatments is recommended: metronidazole 2 g PO or tinidazole 2 g PO. Alternative therapy is metronidazole 500 mg PO twice daily for 7 days (see Table 98-4). Because these nitroimidazoles can cause a disulfiram-type reaction in persons who subsequently consume alcohol, patients taking these agents should be advised to avoid imbibing for 24 or 72 hours after the last dose of metronidazole or tinidazole, respectively. Topical metronidazole is available but is less efficacious than oral preparations for treatment of trichomoniasis and is not recommended for this use.

In pregnant women, trichomoniasis has been associated with premature rupture of membranes, premature labor, and low birth weight. Despite this association, treatment has not been shown to reduce these complications, although it may relieve local symptoms in the woman, may decrease the risk of infection of the newborn, and may decrease sexual transmission. Symptomatic pregnant women desiring treatment should be counseled on the risks and benefits. Metronidazole as a single 2-g dose is considered safe in any stage of pregnancy as studies have not shown an association between its use during pregnancy and mutagenic or teratogenic effects in the fetus. Because its safety has not been well evaluated, tinidazole should not be used in pregnant patients.

Sexual partners of patients with *T. vaginalis* should be treated, and patients should be instructed to avoid sexual contact until they and their partners are clinically cured.

**CANDIDIASIS**

Vulvovaginal candidiasis most often is caused by *Candida albicans* but can be caused by other *Candida* species and other yeasts. It is estimated that 75% of women will have at least one episode of yeast vulvovaginitis in their lifetime, and 40 to 45% will have two or more episodes.

Common presenting signs and symptoms include vulvar itching or soreness, vaginal discharge, dyspareunia, and dysuria. Characteristic examination findings are vulvar erythema, vulvar edema or excoriation, and white curdlike vaginal discharge. Satellite lesions also may be seen. Vaginal pH is normal (less than 4.5) (see Table 98-4). Because none of these symptoms or signs is specific for candidiasis and the history and examination findings are relatively unreliable, diagnostic testing is indicated.

Diagnosis typically is based on wet-mount microscopy with use of potassium hydroxide (KOH) preparation or Gram's stain demonstrating yeast or pseudohyphae. The sensitivity of these tests ranges from 40 to 70%. Culture is more sensitive and is considered the gold standard diagnostic modality but is rarely performed, and 10 to 20% of asymptomatic women harbor *Candida* organisms and other yeasts in the vagina.

Multiple short-course topical preparations are available for treatment and effect an 80 to 95% cure rate in patients who complete therapy (see Table 98-4); many are available over the counter. Self-medication with over-the-counter preparations should be advised only for women who have been diagnosed previously with vulvovaginal candidiasis and experience recurrence of the same symptoms. Unnecessary or inappropriate use of over-the-counter preparations is common, can lead to contact or irritant vulvar dermatitis, and may delay treatment for other causes of vulvovaginitis. In addition, patients should be counseled that vaginal preparations are oil based, which may weaken latex condoms and diaphragms. Fluconazole, 150 mg in a single dose, is the only oral agent that is approved by the FDA for the treatment of candidiasis.

Candidal infections can be divided into complicated and uncomplicated types. Uncomplicated vaginitis is seen in 90% of patients. It is characterized by sporadic or infrequent episodes with mild to moderate symptoms caused by *C. albicans* in a normal host. It responds readily to short-course treatments. Complicated infections, associated with severe or recurrent symptoms (four or more episodes of vulvovaginal candidiasis each year), tend to occur in patients with complicating medical problems.
thin, white, homogeneous discharge is present. 5 Vulvovaginal candidiasis in HIV-positive patients is not considered complicated and should be treated as for uncomplicated vulvovaginal candidiasis. Vulvovaginal candidiasis occurs frequently during pregnancy and may be more difficult to cure. Only topical azole therapies, applied for 7 days, are recommended for use during pregnancy; fluconazole is contraindicated.

Evidence to support treatment of asymptomatic sexual partners is lacking. In addition, no direct association has been found between yeast infection and other STDs, and no difference in yeast isolation rates has been observed in patients who have an STD and in those who do not.

**BACTERIAL VAGINOSIS**

Bacterial vaginosis occurs because of a shift in bacterial flora in the vagina, with replacement of the normal H2O2-producing *Lactobacillus* species with high concentrations of a polymicrobial group, including anaerobic bacteria (*Prevotella, Mobiluncus, and Bacteroides* species), *Gardnerella vaginalis*, and *Mycoplasma hominis*, and an attendant increase in the vaginal pH from 4.5 to as high as 7.0. Bacterial vaginosis is the most common cause of vaginal discharge and malodor (see Table 98-4). However, up to 50% of women with bacterial vaginosis are asymptomatic.

The most common manifestation is vaginal discharge, often with an offensive vaginal odor, which may be accentuated after coitus (the alkaline pH of semen induces a fishy odor, recognition of which constitutes a physiologic “whiff test”). Vaginal pruritus and irritation are not common complaints. On examination, a thin, white, homogeneous discharge is present. Diagnosis can be made with the Amsel criteria (see Table 98-4).

Three of the four criteria must be present for diagnosis:

1. A thin, white homogeneous discharge that smoothly coats the vaginal walls.
2. Presence of clue cells in microscopic examination. (True clue cells are epithelial cells that are so heavily stippled with bacteria that the cell borders are obscured. Epithelial cells with few bacteria do not classify as clue cells.)
4. A fishy odor to the vaginal discharge before or after the addition of 10% KOH (whiff test).

Diagnosis also can be made with Gram staining to determine the relative concentrations of bacterial morphotypes (Nugent criteria). Culture isolation of *G. vaginalis* is not useful, because this organism can be cultured from vaginal specimens in more than 50% of healthy women and is therefore not specific. Several other available tests perform acceptably when compared with Gram staining, but these are usually not available in the emergency setting.

All asymptomatic women should be treated. Bacterial vaginosis is associated with an increased risk of acute upper genital tract infection by the various organisms recognized as likely pathogens in such infections. It is not known whether treatment of bacterial vaginosis reduces the risk of ascending infection, so screening for and treatment of bacterial vaginosis in asymptomatic women are not recommended.

Recommended treatment regimens for bacterial vaginosis include metronidazole 500 mg PO twice a day for 7 days, metronidazole gel 0.75% 5 g intravaginally every day for 5 days, and clindamycin cream 2% 5 g intravaginally at bedtime for 7 days. The vaginal cream is oil based and may weaken condoms and diaphragms; patients should be advised of this possibility. Alternative regimens include tinidazole 2 g PO once daily for 3 days, tinidazole 1 g PO once daily for 5 days, clindamycin 300 mg PO twice a day for 7 days, or clindamycin ovoids 100 mg administered intravaginally once at bedtime for 3 days. Alternative regimens have lower efficacy for treatment of bacterial vaginosis. Patients taking tinidazole and metronidazole should be advised to avoid alcohol for up to several days after treatment to avoid the disulfiram-like reaction that may be seen when these agents are taken. Treatment of sexual partners does not affect response to therapy or recurrence rates and is therefore not recommended.

All pregnant women with symptoms should be treated. Bacterial vaginosis during pregnancy is associated with premature rupture of membranes and preterm labor, preterm birth, and postpartum endometritis. Studies have not consistently demonstrated a benefit of treatment for asymptomatic pregnant patients, but treatment may be considered in women with a previous preterm birth or those who are at high risk for preterm birth. Recommended treatment regimens in pregnancy include metronidazole 500 mg PO twice a day for 7 days, metronidazole 250 mg PO three times a day for 7 days, and clindamycin 300 mg PO twice a day for 7 days. Topical agents are not recommended for use during pregnancy. Metronidazole use during pregnancy has no demonstrated association with teratogenic or mutagenic effects in newborns.

**OTHER CAUSES OF GENITAL DISCOMFORT**

Many other conditions manifest with vulvovaginal itching or discharge. Considerations in the differential diagnosis include the sexually transmitted and vaginal infections discussed previously, as well as allergic or chemical vaginitis, atrophic vaginitis, scabies, pediculosis pubis (genital lice), and vaginal foreign bodies.

Chemical vaginitis most commonly is associated with the use of douches, scented soaps, or feminine hygiene products. In addition, some women with a latex allergy may report vaginal itching and discomfort after intercourse with a partner who uses latex condoms. Diagnosis is by history, and discontinuing use of the offending agent usually is sufficient treatment.

Atrophic vaginitis occurs when levels of circulating estrogens decrease after menopause. Patients may report increased vaginal itching, vulvar discomfort, and dyspareunia. Other sources of discomfort, such as *Candida* infection, should be ruled out, because relative lack of estrogen predisposes affected women to vaginal and vulvar infections. Treatment typically consists of topical estrogen creams.

The mite *Sarcoptes scabiei* causes scabies infestation, and any part of the body may be affected. Transmission is by skin contact. The main symptom is pruritus, which is caused by a hypersensitivity reaction to mite excrement. The diagnosis is made clinically by identification of characteristic silvery lines seen in the skin where the mites have burrowed. Papules or nodules also may be noted, especially in the genital area. Scrapings viewed under the light microscope contain mites, confirming the diagnosis. Topical treatment for scabies is permethrin cream (preferred agent), lindane, or benzyl benzoate. In infants, permethrin 5% cream is the only indicated therapy. This agent can also be used in children, who may also be treated with benzyl benzoate 12.5%. Ivermectin, the only oral treatment for scabies, is more effective than topical permethrin.

*Phthirus pubis* is a crab louse transmitted by close body contact. Adult lice infest pubic hair, body hair, and occasionally the eyebrows and eyelashes. Eggs (nits) adhere to the hairs. The main symptom is pruritus caused by hypersensitivity reaction to the feeding lice. Diagnosis is based on finding adult lice or eggs. Treatment includes pyrethrin shampoos and permethrin 1% rinses (available over the counter), permethrin 5%, malathion, lindane, and ivermectin topical.
PELVIC INFLAMMATORY DISEASE

Perspective

PID is a spectrum of disorders of the female upper genital tract, including any combination of endometritis, salpingitis, peritonitis, and tubo-ovarian abscess. Approximately 750,000 cases of PID are diagnosed annually in the United States. The serious complications of PID (infertility, ectopic pregnancy, and chronic pelvic pain) account for a significant proportion of non-HIV STD-related morbidity in the United States and affect approximately 25% of diagnosed patients. PID is reported to be the most common serious infection in women of reproductive age and causes approximately 30% of infertility cases, 50% of ectopic pregnancies, and many cases of chronic pelvic pain.

Principles of Disease

PID is an ascending infection, with the infecting microorganisms spreading from the cervix and vagina to the upper portions of the female genital tract. Although the most commonly implicated organisms are C. trachomatis and N. gonorrhoeae, the cause of PID often is polymicrobial, and various microorganisms have been recovered in patients with acute PID, including genital mycoplasmas and anaerobic and aerobic bacteria from endogenous vaginal flora such as Prevotella species, peptostreptococci, G. vaginalis, E. coli, Haemophilus influenzae, and aerobic streptococci. Although organisms that are associated with sexual transmission are those most commonly found with PID, this infection can be caused by nonsexually acquired organisms. Patients diagnosed with PID should be counseled that the infection can be acquired nonsexually and that the diagnosis does not imply that either sexual partner may have had sexual encounters outside the relationship.

Risk factors for the development of PID include young age, multiple sexual partners, cigarette smoking, and menses. Intrauterine contraceptive devices (IUDs) have previously been implicated as a major risk factor for PID; however, IUDs increase the risk of PID only in the 3 weeks after insertion. It should be noted that nearly half of patients with PID do not have identifiable risk factors; a lack of risk factors does not rule out the infection.

Clinical Features

Owing to the wide range of presenting signs and symptoms, acute PID is challenging to diagnose. The most common presenting symptom is lower abdominal pain. Other signs and symptoms include dyspareunia, abnormal bleeding, abnormal cervical or vaginal discharge, abdominal pain, and fever. Physical examination may reveal a fever, abdominal pain, and lower abdominal tenderness, cervical motion, or adnexal tenderness (unilateral or bilateral) on bimanual palpation.

Studies show that many women with PID demonstrate mild, vague, or subtle symptoms, often not recognized as manifestations of PID by either the patient or her physician. Unrecognized PID probably is as common as, if not more common than, clinically apparent disease, and it is estimated that up to two thirds of cases may go unrecognized. Silent or atypical PID is a term that has been used to describe the underlying disorder in women with documented tubal infertility who have no history of being diagnosed with PID despite confirmed chronic inflammatory residua.

Patients also can report right upper quadrant pain and tenderness, which may be preceded or accompanied by the signs and symptoms of PID. This syndrome, known as peritubalitis or Fitz-Hugh–Curtis syndrome, has been associated with both gonococcal and chlamydial salpingitis. Transaminases will be normal. Fitz-Hugh–Curtis syndrome may develop in up to 10% of patients with PID, depending on the organisms implicated as the cause.

When compared with laparoscopy as the gold standard for making the diagnosis of PID, the clinical examination has a sensitivity ranging from 65 to 90%. The positive predictive value of the clinical diagnosis depends on the epidemiologic milieu in which the diagnosis is made. There is no single historical, physical, or laboratory finding, or combination of these that is adequately sensitive or specific to permit a definitive diagnosis of PID. With that in mind, and because of the difficulty in making the diagnosis and the serious long-term sequelae of PID, current recommendations call for a low threshold to both consider this clinical entity and to institute appropriate treatment in patients who may have PID.

The CDC recommends empirical treatment for PID in sexually active young women experiencing pelvic or lower abdominal pain if any one of the following minimum criteria is present without other identifiable causes:

- Cervical motion tenderness
- Adnexal tenderness
- Uterine tenderness

Controversy also surrounds what constitutes cervical motion tenderness. Although the traditional “chandelier sign” (pain so severe the patient ends up “swinging from a chandelier”) of severe tenderness has been taught as the criterion standard, the patient herself should be questioned about her degree of pain. If it is more than the usual discomfort experienced by the patient during a pelvic examination, this should be considered positive evidence for cervical motion tenderness.

Other criteria that support but are not necessary for the diagnosis of PID include the following:

- Oral temperature greater than 101° F (38.3° C)
- Abnormal cervical or vaginal mucopurulent discharge
- Presence of WBCs on wet mount preparations of vaginal secretions
- Elevated erythrocyte sedimentation rate
- Elevated C-reactive protein level
- Laboratory documentation of cervical infection with N. gonorrhoeae or Chlamydia

As more criteria for diagnosis are met, the specificity increases but the sensitivity decreases. The absence of either mucopurulent cervical discharge or WBCs on wet mount preparations makes the diagnosis of PID unlikely; in such cases, other causes of abdominal pain should be sought. Ultrasonography also may be useful in the diagnosis of PID, especially in identifying tubo–ovarian abscess or pyosalpinx. If the diagnosis is unclear, particularly in patients with fever and peritoneal signs, further testing is indicated. In these cases, computed tomography may rule out other causes of peritoneal clinical findings, such as appendicitis or diverticulitis, and in some cases laparoscopy may be necessary to determine the cause of the patient’s illness.

Differential Diagnosis

The differential diagnosis of lower abdominal pain in young women is broad in scope. Other common diagnostic considerations include ectopic pregnancy, acute appendicitis, endometriosis, ovarian cysts, and functional abdominal pain.

Management

The goal of treatment in PID is to prevent the chronic sequelae of infection. Treatment regimens should provide broad-spectrum coverage against likely pathogens, including N. gonorrhoeae, Chlamydia, anaerobes, gram-negative bacteria, and streptococci. Although endocervical testing is recommended in these patients, negative results do not preclude upper tract infection.
Table 98-5  Treatment for Pelvic Inflammatory Disease

<table>
<thead>
<tr>
<th>REGIMEN A</th>
<th>REGIMEN B</th>
<th>REGIMEN C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inpatient</strong></td>
<td><strong>Inpatient</strong></td>
<td><strong>Inpatient</strong></td>
</tr>
<tr>
<td>Ceftriaxone 2 g IV q6h or Clindamycin 900 mg IV q8h</td>
<td>Gentamicin 2 mg/kg IV or IM load, then 1.5 mg/kg IV or IM q8h or single daily dose (3-5 mg/kg) can be substituted</td>
<td>Other parenteral third-generation cephalosporin (e.g., ceftriaxone or cefotaxime)</td>
</tr>
<tr>
<td>Cefotetan 2 g IV q12h plus Doxycycline 100 mg PO or IV q12h</td>
<td>Cefotetan 100 mg PO bid × 14 days with or without Ceftriaxone 250 mg IM once or Doxycycline 100 mg PO bid × 14 days with or without Metronidazole 500 mg PO bid × 14 days</td>
<td>Ceftriaxone 100 mg PO bid for 14 days with or without Metronidazole 500 mg PO bid × 14 days</td>
</tr>
<tr>
<td>Continue until at least 48 hours after improvement</td>
<td>Continue until at least 48 hours after improvement</td>
<td>Continue clindamycin 450 mg PO q6h or change to doxycycline</td>
</tr>
<tr>
<td><strong>Outpatient</strong></td>
<td><strong>Outpatient</strong></td>
<td><strong>Outpatient</strong></td>
</tr>
<tr>
<td>Ceftriaxone 2 g IM plus Clindamycin 900 mg IV q8h</td>
<td>Ceftriaxone 250 mg IM once plus Ceftriaxone 250 mg IM once</td>
<td>Metronidazole 500 mg PO bid × 14 days</td>
</tr>
<tr>
<td>Doxycycline 100 mg PO bid × 14 days with or without Gentamicin 2 mg/kg IV or IM load, then 1.5 mg/kg IV or IM q8h or single daily dose (3-5 mg/kg) can be substituted</td>
<td>Doxycycline 100 mg PO bid × 14 days with or without Metronidazole 500 mg PO bid × 14 days</td>
<td>Doxicycline 100 mg PO bid for 14 days with or without Metronidazole 500 mg PO bid × 14 days</td>
</tr>
<tr>
<td>Continue doxycycline 100 mg PO bid for 10-14 days total</td>
<td>Continue doxycycline 100 mg PO bid for 10-14 days total</td>
<td>Continue clindamycin 450 mg PO q6h or change to doxycycline</td>
</tr>
</tbody>
</table>

*IM, intramuscularly; IV, intravenously; PO, orally.*

Delaying treatment may increase the risk of developing long-term sequelae.

In patients with mild-to-moderate disease, no studies have clearly demonstrated differences in efficacy of parenteral versus oral therapy, or of inpatient versus outpatient treatment. The decision to hospitalize a patient should be based on the clinical presentation and other comorbid or complicating factors. The CDC suggests that any of the following criteria constitutes grounds for hospitalization:

- Surgical emergencies such as appendicitis cannot be excluded.
- The patient is pregnant.
- The patient does not respond clinically to oral antimicrobial therapy.
- The patient is unable to follow or tolerate outpatient oral regimens.
- The patient has a severe illness, nausea and vomiting, or high fever.
- The patient has a tubo-ovarian abscess.

Parenteral and oral regimens are listed in Table 98-5. If outpatient treatment is chosen, patients must be reevaluated within 24 to 48 hours to assess response to oral therapy. If there is no response, the patient should be hospitalized for parenteral antibiotic therapy and confirmation of the diagnosis.

Patients should demonstrate significant clinical improvement, such as defervescence, decreased abdominal tenderness, and reduction in uterine, adnexal, and cervical motion tenderness, within 3 days of initiation of therapy. Sexual partners of patients diagnosed with PID should be evaluated and empirically treated for gonorrhea and chlamydial infection. Patients should be counseled to avoid sexual activity until both they and their partners have completed treatment. It is recommended by some specialists that patients with documented gonorrhea and chlamydial infection be reevaluated for test of cure in 4 to 6 weeks after completion of therapy, although this practice is not universal.

**KEY CONCEPTS**

- Patients with ulcerative genital lesions should be considered to have an STD and should be tested and treated accordingly.
- Patients with suspected gonorrheal infection also should be treated for chlamydial infection.
- Sexually active women with adnexal or cervical motion tenderness should be treated for PID.
- A single dose of azithromycin is inadequate to treat upper female genital tract infection; patients require a 2-week course of antibiotics.
- Asymptomatic women with clue cells on wet mount preparations should not be treated for bacterial vaginosis.
- Pregnant women with bacterial vaginosis should not be treated if they are asymptomatic unless they are at risk for preterm labor or premature birth (i.e., if they have a history of preterm labor, miscarriage, or premature rupture of membranes).
- Patients with sexually transmitted infections are at risk for HIV infection and should be either tested in the ED or referred for HIV testing.

*The references for this chapter can be found online by accessing the accompanying Expert Consult website.*
References