

*C. trachomatis* and *N. gonorrhoea* seems appropriate in this population, with the recognition that a few patients will have false-positive tests. The upside is that infected asymptomatic patients will be detected. Which screening test used – culture, DNA probe, or PCR testing – will be dependent in part upon the local economics of medical care.

Although less frequent now, an occasional patient will be seen with painful vulvar swelling, a Bartholin's abscess. Appropriate PCR testing for *N. gonorrhoea* and cultures for anaerobic bacteria can be obtained when incision and drainage are accomplished.

### MICROBIOLOGY AND IMMUNOLOGY

A multitude of sexually transmitted microorganisms causes vaginal and vulvar diseases. The probability a clinician will ever see a woman with any of the microorganisms discussed below will depend on the location and type of their medical practice. Nevertheless, a familiarity with the signs and symptoms of the various STDs is essential to be able to perform an accurate differential diagnosis.

Molluscum contagiosum is a sexually transmitted poxvirus and the cause of papular skin and mucosal lesions. It is a double-stranded DNA virus enclosed in a lipoprotein coat. Autoinoculation from the genital tract to other body sites is common. This infection is more common in females and is becoming an increasing problem in HIV-infected individuals. Many individuals with no known exposure to this virus are, nevertheless, positive for anti-molluscum contagiosum antibodies. Molluscum contagiosum lacks most of the immune defense-related components present in other poxviruses. Nevertheless, it persists within lesions in the host for prolonged periods of time. Two of the viral proteins have been shown to inhibit apoptosis of infected cells. Other molluscum contagiosum proteins inhibit phagocytic cells from migrating to the site of infection and block the activity of interleukin-18, an inducer of interferon production<sup>7</sup>.

Hepatitis B virus is a member of the hepadnavirus family, a class of viruses that infect hepatocytes and elicit acute and chronic liver disease. In addition to its presence in semen and blood, the virus has also been identified in saliva and breast milk. The hepatitis B genome is unusual in that it consists of a small, circular DNA molecule that is partially double stranded, along with a linear single-stranded region of variable length. The virus is double coated with two lipoprotein envelopes. Infected cells release a large excess of particles containing only the envelop glycoproteins and lipids into the circulation, as compared to complete DNA-containing virions. The majority of hepatitis B infections are acute and self-limiting, and result in immunity to reinfection. However, in a small percentage of cases a chronic infection develops with a variable concentration of virions persisting in the bloodstream. Interestingly, individuals that have successfully cleared hepatitis B as well as those with a chronic infection, have comparable sustained anti-viral antibody responses. Cytotoxic T cell responses, however, differ between the two groups and appear to be the main anti-viral defense mechanism. The hepatitis B virus does

not appear to be directly cytotoxic to hepatocytes. Rather, it is the extent of the host's immune response to the infection that determines the degree of liver damage<sup>8</sup>.

*Haemophilus ducreyi* is a short, nonmotile Gram-negative rod and the cause of chancroid, with painful and foul smelling genital and rectal ulcers. It is a predominant cause of genital ulceration in tropical and sub-tropical climates, and in regions with poor personal hygiene. Many *H. ducreyi* infections are resistant to antibiotics due to carriage by the microbe of one or more plasmids containing antibiotic resistance genes. A lesion in the skin or mucous membrane, due to abrasion during sexual intercourse, a concomitant infection or other irritation, is the portal of entry for *H. ducreyi*. An infiltration of polymorphonuclear leukocytes and subsequent ulceration form the characteristic lesions.

Genital ulcers also result from infection by *Calymmatobacterium granulomatis*, a Gram-negative encapsulated bacterium and the causative agent of donovanosis. Like chancroid, donovanosis is most prevalent in warm climates. However, the two diseases differ in that the lesions of donovanosis are painless.

Three serovars of the oblate intracellular microbe *Chlamydia trachomatis*, L1, L2, and L3, are other genital ulcer-causing microorganisms. The disease caused by these bacteria is called lymphogranuloma venereum. In infected women, a painless papule which subsequently ulcerates appears on the vulva, vaginal wall, or cervix. The secondary stage of infection, appearing predominately in men, is characterized by the appearance of painful inguinal lymphadenopathy. If untreated, lymphatic obstruction and elephantitis of the genitalia can develop.

Yet another cause of genital ulcers is *Treponema pallidum*, the spirochete bacterium responsible for syphilis. *T. pallidum* passes through microscopic genital tract abrasions and induces formation of genital ulcers known as chancres (primary syphilis) on the vulva, vaginal wall, or cervix. Following their replication, the microbe disseminates through the circulatory and lymphatic system resulting in formation of a rash, low-grade fever, and lymph node enlargement (secondary syphilis). These symptoms resolve and a latency period ensues. Untreated syphilis may then progress to a tertiary stage characterized by central nervous system (CNS), vascular system, and/or skin and bone involvement. The outer membrane of *T. pallidum* lacks lipopolysaccharide and is also largely devoid of transmembrane proteins. Thus, the microbe is poorly immunogenic and infected and treated individuals remain susceptible to reinfection<sup>9</sup>.

*Neisseria gonorrhoea*, the causative microorganism of gonorrhoea, is a Gram-negative diploid bacterium. In women, it primarily infects columnar epithelia in the urethra, cervix, and rectum. However, the vulva and vagina are also sites of infection in prepubescent girls. Some sexually active women will develop a Bartholin's abscess caused by *N. gonorrhoea*. Subsequent recurrent Bartholin's abscesses are usually associated with the recovery of anaerobic bacteria. Unlike in men, gonococcal infections in women are typically asymptomatic. The lack of detection or

misdiagnosis has serious consequences, since untreated infections ascend to the fallopian tubes and cause pelvic inflammatory disease. Treatment of *N. gonorrhoea* is becoming increasingly difficult due to the presence of plasmids that carry antibiotic resistance genes.

The ectoparasite, *Phthirus pubis*, infects pubic hair and is the cause of pubic lice. After sexual transmission from an infected to a noninfected individual, the female *P. pubis* lays an egg that becomes firmly attached to the base of a hair follicle. After a 7-day incubation period, the emerging parasite induces a skin lesion, secretes saliva and then ingests a mixture of saliva and blood. The severe itching that ensues is due to an immediate hypersensitivity reaction to allergens in the saliva.

### DIAGNOSIS

The key to the care of the patients with STDs of the vulva, vagina, or lower genital tract is an awareness of the wide variety of different clinical presentations and the knowledge of appropriate laboratory tests necessary to confirm the diagnosis.

Molluscum contagiosum has a characteristic appearance, a central umbilicated area filled with a semi-solid white material. These lesions can present in a number of forms. Figure 100 shows a single lesion. These lesions can spread rapidly. Figure 101 shows a patient with multiple molluscum contagiosum lesions. Figure 102 shows the lesions immediately after local treatment when central white material has been removed. If local treatment fails to clear the lesions, a biopsy should be obtained to confirm the initial clinical impression.

Patients with pediculosis pubis seek medical attention for intense and continuous vulvar itching. On questioning, they may have noticed lice or nits on their pubic hair. This is a population in whom a few minutes surveillance of the pubic region with a colposcope will pick up the visible, moveable ectoparasites. Under magnification, these are ugly creatures; their appearance and movement makes many an examiner's skin crawl (103). Patients with scabies present for care, because of unbearable vulvar pruritis. Again, surveillance with a colposcope often reveals the presence of the *Sarcoptes scabiei* (104). These women will often have a vulvar rash, reflective of their contact dermatitis.



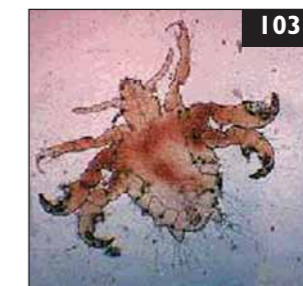
100 A patient with a solitary molluscum contagiosum lesion.



101 A patient with a field of multiple molluscum contagiosum lesions.



102 A patient with molluscum contagiosum after local treatment has removed the central white core.



103 A magnified picture of a body louse.



104 A magnified picture of a *Sarcoptes scabiei*.

Patients with ulcerative disease of the vulva have a variety of clinical manifestations that require appropriate laboratory testing to determine the pathogen involved. Persistent or recurrent vulvar ulcers may not have an infectious etiology. The physician must not stint on the use of biopsy to check for skin cancer, Behçet's disease, aphthous ulcers, vulvar Crohn's disease, or vulvar pemphigoid. This is a situation whose review of the biopsy by a dermatopathologist is needed to achieve an accurate diagnosis. Half the biopsy sample should be sent in special media for immune staining and the other half in formalin. These conditions will be discussed in more detail in Chapter 15. Knowing the diagnosis, the appropriate therapy can be prescribed.

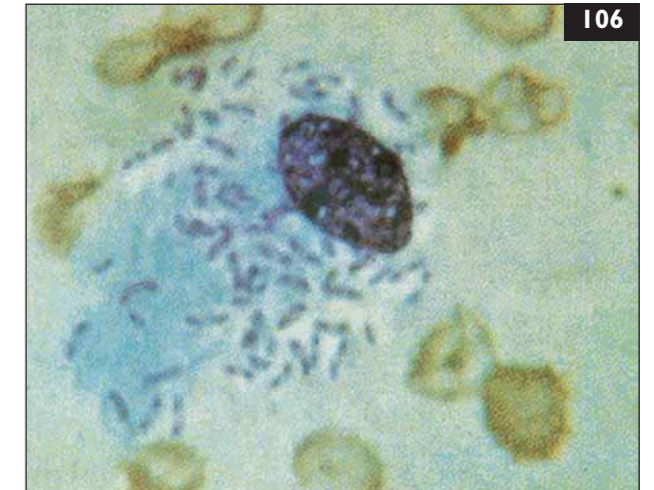
Viruses will be the cause of most of the vulvar ulcerations seen by practicing physicians. For the doctor in a private office or surgery, the most commonly encountered pathogens in patients with small vulvar ulcerations will be HSV-1 and HSV-2. The vagaries of clinical presentation and the necessary laboratory testing to confirm the diagnosis has been presented in Chapter 8. In immunosuppressed women, unexpected viral pathogens can be confirmed by culture. In one such patient, the viral culture of the lesion grew CMV (99).

The remainder of these genital ulcer diseases (chancroid, granuloma inguinale, lymphogranuloma, and syphilis) are caused by bacteria. To make an accurate diagnosis requires linking the clinical findings with appropriate laboratory testing. Of this group of bacteria-caused ulcerative disease of the vulva, chancroid is probably the most common in the United States. Despite this, it is still rare. These women usually present with painful vulvar ulcers that are not indurated and usually have unilateral inguinal lymphadenopathy (105). There should be caution in making the diagnosis for other vulvar infections can have a similar presentation. Every possible confirmatory test should be ordered. To confirm the microbiologic diagnosis of chancroid requires plating exudates from the lesion on a special agar media within 1 hour of the patient's examination. If this can be done, there is the potential for isolating the offending organism, *Hemophilus ducreyi*. The sensitivity of this testing is 80%. There is a twofold problem in this approach for most practitioners: they cannot get the specimen to the laboratory for plating within this time frame, and some commercial laboratories may not have this culture media available. If there is an urban hospital nearby, a referral to the emergency room or a STD clinic may be the best option to obtain this diagnostic study. Other infections can masquerade as chancroid. In one study in Atlanta, 80% of the patients thought to have typical chancroid lesions were found to be culture-positive for HSV-1 and HSV-2<sup>10</sup>. With this in mind, another portion of the exudate should be sent for culture for HSV-1 and HSV-2 and a blood sample tested for HSV antibody. Not every chancre is painless. If possible, a dark field examination of ulcer exudate should be done as well as blood reagin testing, 7 days or more after the first appearance of the ulcer. If both of these alternate tests are negative, the diagnosis of chancroid is likely, even if *H. ducreyi* is not isolated on culture attempts. Since chancroid ulcers facilitate the spread of HIV infections, serologic testing for HIV should be done in these patients.

Granuloma inguinale is a very uncommon disease in the United States and western Europe. Because it is endemic in some tropical and developing areas, for example, India, Papua New Guinea, central Australia, and southern Africa, a history of travel or intimate contact with someone from that area should be obtained<sup>5</sup>. The primary lesion is an indurated papule, but these women usually present to the physician when it ulcerates. These lesions visually show gross infection with necrosis and purulence. Surprisingly, they are not painful and usually there is no inguinal adenopathy. The ulcerative lesions are highly vascular and bleed easily. The causative organism, *Calymmatobacterium granulomatis*, is a Gram-negative rod that is difficult to culture. A PCR test has been devised, but it is not clinically available. There is no serologic test for this infection. The diagnosis can definitively be made by either a scraping of the lesion or a biopsy tissue section stained with a Wright or Giemsa stain, in which Donovan bodies can be seen (106). There can be other causes for these indurated lesions. Figure 107 shows the site biopsied the day before in a woman who frequently visits southern Africa. Using selective staining, she was determined to have mycosis fungoides. In patients with granuloma inguinale, there are bipolar black clusters of bacteria in the cytoplasm of large histiocytes. Again, in dealing with patients with this vulvar ulceration, screening tests should be done for HSV, and *Treponema pallidum*. Often, these lesions are extensive and a tissue biopsy is also indicated to rule out the presence of cancer. Since a concurrent HIV infection can delay healing, HIV testing should be done in these women.

Lymphogranuloma venereum is such a rare disease in the United States that most private practitioners will probably never see it. There are less than 600 cases reported annually, and diagnosed infection is ten times more common in men than women. It has a variety of clinical presentations. The primary lesion is a self-limited genital ulcer at the site of inoculation, which usually does not cause patients to seek medical care<sup>5</sup>. If this is not treated, patients usually develop inguinal adenopathy with overlying brawny vulvar skin (108), and the abscesses within the nodes coalesce and drain from one or more sinus tracts (109). This later stage of the disease is the time when most patients present to the physician for care. The microbiologic pathogens for lymphogranuloma venereum are *Chlamydia trachomatis* serovars L1, L2, and L3. Two clinical care realities usually prevent a microbiologic confirmation: it is an uncommon disease, and a DNA probe or PCR to confirm the diagnosis is often not available to the practicing physician in a private office. These serovars can be grown on tissue culture, but tissue culture is usually not available in clinical laboratories. This leaves one available alternative to confirm the diagnosis: a serological blood test for complement fixation titers that are 1:64 or greater. In common with other sexually transmitted genital ulcer diseases, infections with HSV and *Treponema pallidum* should be ruled out by concomitant testing. HIV testing should be performed as well.

**105**  
Ulcerative lesion of patient with chancroid.



**106** Donovan bodies. Bacteria are found in the cytoplasm of macrophages, and assume the shape of a safety pin.

**107** Solitary vulvar lesion of a patient suspected of having granuloma inguinale. Special staining confirmed the diagnosis of mycosis fungoides.



**108** The brawny vulvar lesion of a patient with lymphogranuloma venereum.



**109** Draining sinus tracts in a patient with lymphogranuloma venereum.

The primary lesion of an infection due to *T. pallidum* is a chancre. This lesion starts as a small papule that breaks down to form a superficial, painless ulcer. More than one lesion can be seen. These lesions are painless, and they go away without systemic antibiotic treatment, suggesting to the patient that whatever caused the infection has been eliminated by her body's host defense mechanism. If the physician encounters an indurated painless ulcer, syphilis should be at the head of the list of differential diagnoses. The diagnosis can be confirmed by the presence of the corkscrew-shaped pathogen, *T. pallidum*, on a dark field microscope examination of serum obtained by scraping the surface of the lesion. The difficulty will be to find both the equipment and the medical personnel trained to do the dark field study. As an alternative, a biopsy can be taken from the rim of the lesion with a request to the pathology department to stain with silver salts in an attempt to visualize these spirochetes. If an accurate dark field examination cannot be obtained, the diagnosis can be established by obtaining a positive reagin test from blood obtained taken 7 days or more after the lesion was first noted by the patient. This positive reagin test is not specific. The diagnosis of a *T. pallidum* etiology can be confirmed by a positive specific treponemal test, fluorescent treponemal antibody absorbed (FTA-ABS) test or *T. pallidum* particle agglutination (TP-PA) test<sup>5</sup>. These patients with a painless genital ulcer should also be tested for granuloma inguinale and herpes. Again, in this population HIV testing should be done.

A much more common cause of vulvar discomfort caused by infection is a Bartholin's abscess. It presents as a painful unilateral swelling (110). Under local anesthesia in an outpatient setting, incision and drainage (I&D) are performed. The free flow of purulent material is obvious. Patients with a recurrent Bartholin's abscess should have a more extensive operation performed. After I&D drainage with a cruciate incision, a drain is left in place to maintain ostia patency (111). Although first episodes of a Bartholin's abscess can be caused by *Neisseria gonorrhoea*, recurrences usually are associated with the recovery of anaerobic bacteria.

The first hint to the physician that a patient might have a STD of the vagina or lower genital tract will be garnered from the history. When these young women, who are sexually active without using any barrier protection, respond to the question that they have a new sexual partner, the physician's level of concern should increase. This is elevated further when they also note the recent onset of a troublesome, but not serious set of symptoms that includes urgency and frequency of urination, vaginal spotting, or an increased vaginal discharge. These symptoms are so slight that they usually will not be volunteered until the physician asks specific questions. On vaginal examination, vaginal secretions are obtained for microscopic study with a saline and potassium hydroxide (KOH) prep, vaginal pH is measured from the lateral wall of the vagina, and a PCR test is obtained for *Neisseria gonorrhoea* and *Chlamydia trachomatis*. Suspicions of a sexually transmitted bacterial

infection should be further heightened by an alkaline vaginal pH and the presence of large numbers of white cells (WBCs) on the microscopic examination of the saline prep. This presence of WBCs in the vaginal smear is the most sensitive test to determine if the patient has upper genital tract infection<sup>11</sup>. There are other important points to note during the pelvic examination. It is difficult to make a diagnosis of cervicitis, based upon the gross appearance of the cervix, either with a naked-eye view or the added magnification of a colposcope. A large field of columnar epithelium on the face of the cervix is common in these young sexually active women, and it has a bright red appearance (112). If cervicitis is suspected, a cotton swab is placed in the endocervical canal, allowed to remain there for a few seconds, and when withdrawn and held against a white background, yellow mucopus can be seen in positive cases. The diagnosis is more certain when a drop of the mucopus is added to saline, and on microscopic examination, myriads of WBCs are seen. This is the best office test available to confirm the diagnosis of cervicitis<sup>12</sup> (113). On the bimanual examination of the patient with this history, these office laboratory findings, the presence of cervical motion, and adnexal tenderness should confirm the diagnosis of an upper genital infection.

Concerns about four other sexually transmitted viral diseases should lead to diagnostic testing in the sexually active young woman, not in a monogamous relationship who also is not using any barrier methods of protection.

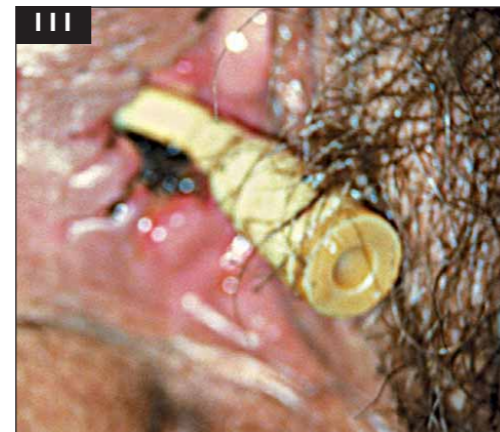
The most commonly sexually transmitted virus is the human papilloma virus (HPV) (Chapter 9). For the patient not previously immunized, blood tests can be performed for hepatitis B antibodies and, if she is pregnant, the hepatitis B surface antigen as well. For the woman planning a pregnancy, or when seen early in pregnancy, blood should be drawn to test for CMV antibodies. With the patient's permission, blood should be drawn for HIV antibodies.

### TREATMENT

There are a variety of effective treatments for molluscum contagiosum. A tried-and-true quick method for most gynecologists is to unroof the central core of each lesion with a needle or a scalpel and then apply silver nitrate to the base. The dermatologist's approach of using a freezing nitrous oxide spray to each lesion is preferable. It is well tolerated and results in a small scar. Imiquimod cream, applied directly three times a week to each lesion by the patient, is also effective. There are three problems with this approach, however: (1) imiquimod can irritate the tissue around the lesion, (2) it takes weeks or months to eliminate the lesion, and (3) there is a failure rate, which is very distressing to these young patients who have carefully followed a treatment regimen for what seems to them to be a long period of time.



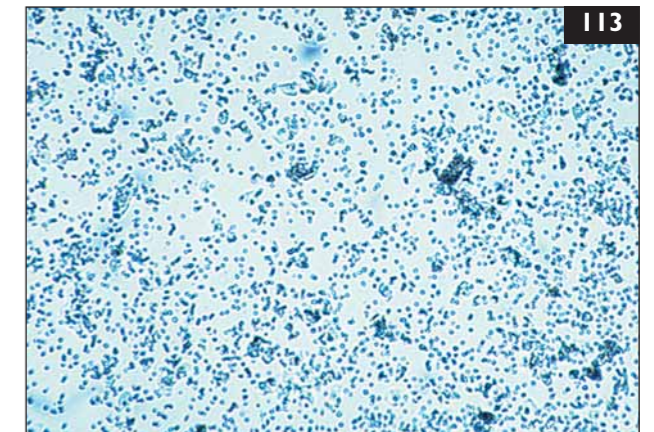
110 Unilateral vulvar swelling associated with a Bartholin's abscess.



111 Bartholin's abscess after incision and drainage, with drain in place.



112 Face of cervix. The columnar epithelium has a bright red appearance.



113 Microscopic examination of a saline preparation of vaginal fluid. The field is covered with white blood cells.

Pediculosis pubis is an easily managed infection, because there is a variety of treatments, there is a short duration of treatment, and the follow-up occurs within 1 week of treatment. There are three different treatment regimens recommended by the CDC<sup>5</sup> (Table 15). The patient should be re-evaluated 1 week later if symptoms persist, with a careful colposcopic survey of the areas in question. Any sexual partners of this patient within the last month should be treated as well. Bedding and clothing should be decontaminated by machine washing and drying or dry cleaning.

Scabies also has a variety of treatment options. The regimen recommended by the CDC is the total body application of permethrin cream (5%) from the neck down, to be washed off in 8–14 hours<sup>5</sup>. There are alternative treatments, but strict guidelines of care must be followed to avoid complications. Lindane (1%) either 1 oz of lotion or 30 g of cream is applied in a thin layer to the entire body from the neck down to be washed off in 8 hours. If too much is absorbed, this drug has toxicity. Seizures have been reported when applied after a hot bath or when the patient has an extensive dermatitis. It should not be prescribed in pregnant or lactating women, or in children 2 years of age or younger. The reports of aplastic anemia after lindane administration have eliminated this drug as an option for many practicing physicians. Alternatively, ivermectin 200 mg/kg orally can be given, to be repeated in 2 weeks<sup>5</sup>. In addition, bedding and clothing should be machine washed and machine dried, or dry cleaned if machine washing is not recommended for the clothes.

There is a wide variety of CDC-recommended antibiotic regimens for the treatment of the patient with chancroid<sup>5</sup>. The single-dose options have appeal, for these are the regimens that patients are most likely to comply with and therefore receive the full intended antibiotic dose. They can be given a single oral dose of 1 g of azithromycin or single-dose intramuscular 250 mg of ceftriaxone. If the patient balks at the single-dose regimen, more extended oral regimens can be used, either ciprofloxacin 500 mg orally twice a day for 3 days, or erythromycin base 500 mg orally three times a day for 7 days. There can be patient problems

with either of these latter two regimens. Ciprofloxacin increases the half-life of caffeine. Patients should be made aware so they decrease their caffeine intake during the 3-day treatment interval and hopefully avoid sleepless nights. Oral erythromycin can cause abdominal distress, bloating, and discomfort, to the extent that some patients will not complete the 7-day course of treatment. The earlier the diagnosis is made and treatment initiated, the better. In far advanced cases, despite successful antibiotic therapy permanent scarring can occur. At the onset or during therapy, any fluctuant buboes should be aspirated, drained, or removed. Another underlying concern in these patients is that the presence of these ulcers facilitates both the acquisition and the spread of HIV infection.

Patients with granuloma inguinale present a more complicated therapeutic problems. The CDC treatment regimens are prolonged and often must be continued beyond the recommended 3-week intervals until all of the ulcer lesions have completely healed<sup>5</sup>. Relapses occur in 10–20% of patients 6–18 months after seemingly effective therapy and will require another course of therapy. All of the treatment regimens are given by the oral route. The two recommended regimens are doxycycline 100 mg orally twice a day for at least 3 weeks or one double strength trimethoprim–sulfamethoxazole (800 mg/160 mg) twice a day for at least 3 weeks. It is important to know the HIV status of these patients.

Patients may not be able to avoid the sun for 3 weeks or are allergic to either of these drugs. Fortunately, there are three alternative regimens: ciprofloxacin 750 mg twice a day for at least 3 weeks, erythromycin base 500 mg four times a day for at least 3 weeks, or azithromycin 1 g each week for 3 weeks. Again ciprofloxacin users need to be cautioned about caffeine intake, and many women will not be able to tolerate the erythromycin regimen because of gastrointestinal (GI) distress. The azithromycin regimen is popular, for it is a less patient-demanding dosage regimen. A clinical response is usually evident within 7–10 days. In an HIV-positive patient, parenteral gentamicin can be added to the regimen, particularly if the initial response to therapy is unsatisfactory.

**Table 15** Treatment regimens for pediculosis pubis

- Permethrin 1% cream rinse applied to affected areas and washed off after 10 minutes
- Or
- Lindane 1% shampoo applied for 4 minutes to the affected area and then thoroughly washed off. Not recommended for pregnant or lactating women or for children aged 2 years or younger
- Or
- Pyrethrine with piperonyl butoxide applied to the affected area and washed off after 10 minutes

When the diagnosis of lymphogranuloma venereum has been made, there are two oral treatment regimens recommended by the CDC<sup>5</sup>. One is doxycycline 100 mg twice a day for 21 days. If the patients are allergic to doxycycline or are pregnant, an alternative regimen is erythromycin base 500 mg four times a day for 21 days. Patients receiving doxycycline should limit their exposure to the sun and those receiving erythromycin should be counseled about possible GI distress. If buboe formation occurs, either aspiration or incision and drainage should be employed. The earlier treatment is begun the less likely the patient will have permanent scarring. Again, the HIV status of these patients should be determined.

For the patient with a Bartholin's abscess, the key to treatment is adequate incision and drainage, with appropriate operative techniques to maintain an opening for the gland. This can be achieved by suturing the edges of the gland to the cruciate incision or by the use of a drainage catheter (111). Antibiotic therapy for 3–5 days is indicated, with the use of antibiotics effective against *Neisseria gonorrhoea* and anaerobic bacteria.

There are many treatment options for the patient with a chancre, the lesion of primary syphilis. The antibiotic of choice is penicillin, but the strategy of antibiotic administration is different from the usual physician selection. *Treponema pallidum* replicates slowly, every 24–26 hours, so that antibiotics need to be in the tissue for days to ensure a cure. Penicillin is the best option, for it has proven effective and has been the most studied of all treatment regimens. A long-acting penicillin, benzathine penicillin G 2,400,000 units given intramuscularly as a single dose is the drug of choice<sup>5</sup>. For the nonpregnant patient allergic to penicillin, a good choice is doxycycline

100 mg orally twice a day for 14 days, because it is better tolerated by patients and they are more likely to complete the full course of therapy. The problem with this 14-day treatment schedule is compliance. As an alternative, it has been suggested that a single 2 g oral dose of azithromycin is effective, but the data are limited. There are two groups of patients that pose additional therapeutic problems. Pregnant women allergic to penicillin should be desensitized and treated with penicillin. As is true with all patients with a genital ulcer, these patients should be tested for HIV. There is concern about inadequate treatment of early syphilis in an HIV-positive patient with the subsequent development of CNS syphilis. There are two acceptable treatment strategies, either treat with a longer treatment regimen, benzathine penicillin G, 2,400,000 injected intramuscularly weekly for three doses, or standard treatment with pre-treatment spinal fluid analysis, close follow-up at 3-month intervals, and a repeat spinal fluid analysis at 6 months. The clinical superiority of the latter approach has not been proven.

The treatment of women with suspected lower genital infection with *N. gonorrhoea* or *C. trachomatis* requires some assessment of the potential extent of the infection. The patient with assumed lower genital tract disease can be treated as an outpatient. The various options are noted in Table 16<sup>5</sup>. The single-dose oral medication combination of azithromycin plus cefixime, ciprofloxacin, ofloxacin, or levofloxacin has great appeal. Some young women, however, regard an intramuscular injection as being sufficient and do not bother to take the oral medication. If there is cervical motion and uterine tenderness present on examination, the physician's concern should be that there has been upper genital tract extension of the disease,

**Table 16** Suspected uncomplicated lower genital tract infections with *Neisseria gonorrhoea* or *Chlamydia trachomatis*

- Cefixime 400 mg orally in a single dose
- Or
- Ceftriaxone 125 mg IM in a single dose
- Or
- Ofloxacin 400 mg orally in a single dose
- Or
- Levofloxacin 250 mg orally in a single dose
- Plus
- Azithromycin 1 g orally in a single dose
- Or
- Doxycycline 100 mg twice a day for 7 days