

vagina, rectum, cervix, and conjunctivae. Importantly, transmission may occur in the absence of symptoms.

The stages of HSV-1/2 infection include primary, latent, and recurrent. Primary infection of genital HSV-1/2 may include fever, headache, other systemic symptoms, and the classic local symptoms of painful genital vesicles or ulcers (multiple) and lymphadenopathy. Oral infections of HSV-1 may include gingivostomatitis and pharyngitis. Symptoms may vary from none to serious and require hospitalization. HSV-1/2 then enters a latent state. Reactivation occurs in a subset of individuals with symptoms less severe than those of primary infection. Some individuals have no reactivation, and others have more than three reactivations per year.

Complications of HSV-1/2 infection include meningitis and proctitis. Recurrent episodes of meningitis (i.e., Mollaret's meningitis) may be caused by HSV-1/2. Other manifestations of HSV-1/2 include herpetic whitlow (e.g., infection of a finger of a health care worker), herpes gladiatorum (e.g., HSV-1/2 skin infections in athletes such as wrestlers), and ocular disease (e.g., keratitis, acute retinal necrosis). HSV-1/2 infection may rarely be associated with erythema multiforme, hepatitis, and encephalitis.

Diagnosis and Differential Diagnosis

The diagnosis of HSV-1/2 is typically made clinically. If possible, lesions should be tested for HSV-1/2 using viral culture (50% sensitivity), PCR, or direct fluorescent antibody (DFA) testing. Alternatively, serology testing for immunoglobulin M (IgM) and immunoglobulin G (IgG) antibodies is available. This test should be reserved for individuals with suspected primary infection or to document chronic infection, and it should usually not be used for screening purposes.

Treatment

Recommended regimens for primary HSV-1/2 infection include acyclovir (400 mg orally three times per day for 7 to 10 days or 200 mg orally five times per day for 7 to 10 days), famciclovir (250 mg orally three times each day for 7 to 10 days), or valacyclovir (1 g orally twice each day for 7 to 10 days). Treatment can also be used for reactivation disease: acyclovir (400 mg orally three times each day for 5 days, 800 mg orally twice each day for 5 days, or 800 mg orally three times each day for 2 days), famciclovir (125 mg orally twice each day for 5 days or 1000 mg orally twice each day for 1 day or 500 mg once followed by 250 mg twice each day for 2 days), or valacyclovir (500 mg twice each day for 3 days or 1 g orally once each day for 5 days).

Individuals with frequent recurrences may be candidates for suppressive therapy. Severe disease should be treated with intravenous acyclovir (5 to 10 mg/kg intravenously every 8 hours). Duration and transition to oral medication should be based on clinical improvement but is usually 7 to 10 days. The safety of systemic acyclovir, valacyclovir, and famciclovir therapy in pregnant women is not established.

Prognosis

Although HSV-1/2 infection cannot be cured, most people are asymptomatic, and suppressive therapy is available. Individuals with HSV-1/2 infection should be educated regarding the

disease, including transmission and available treatments. They should be encouraged to discuss their status with sexual partners, including the possibility that transmission may occur in the absence of symptoms. Individuals should abstain from sex during an outbreak.

Chancroid

Chancroid is a rare cause of genital ulceration in the United States. The infection is caused by the gram-negative rod *Haemophilus ducreyi* and is endemic in parts of Africa and the Caribbean. Classic symptoms include a single or multiple, painful, nonindurated genital ulcers and inguinal lymphadenopathy. Growth of the organism in cultures requires hemin-containing media, and it may appear as a school of fish on Gram stain. PCR may be available in certain areas.

Testing for HSV-1/2 and syphilis should always be performed. Recommended treatment regimens include azithromycin (1 g orally once), ceftriaxone (250 mg intramuscularly once), or ciprofloxacin (500 mg orally twice each day for 3 days). Ciprofloxacin is contraindicated in pregnant and lactating women.

Granuloma Inguinale

Granuloma inguinale is also known as donovanosis. It is caused by the gram-negative bacterium *Klebsiella granulomatis*. The disease is rare in the United States (24 cases in 2010) but endemic in regions of Africa, India, Oceania, and the Caribbean. Clinical manifestations include painless, ulcerative genital lesions with erythema. Classic Donovan bodies may be observed on histopathology.

The recommended treatment regimen is doxycycline (100 mg orally twice each day for at least 3 weeks). Alternative regimens include azithromycin, ciprofloxacin, and sulfamethoxazole-trimethoprim. Azithromycin may be useful for treating granuloma inguinale during pregnancy. Doxycycline and ciprofloxacin are contraindicated in pregnant women.

Other Causes of Genital Ulcers

Other causes of genital ulcers should be considered when the results of routine testing are negative. Noninfectious causes include trauma, Behçet's disease, malignancy, and drug-mediated disease

OTHER SEXUALLY TRANSMITTED INFECTIONS

Genital Warts

Human papillomavirus (HPV) is responsible for a spectrum of cutaneous and mucosal disease, ranging from genital warts to invasive cancer. HPV has been linked to cervical, anal, and oropharyngeal cancer. There are more than 100 types of HPV. Sexually transmitted HPV infection is responsible for genital warts and anogenital carcinoma. More than 80% of sexually active adults acquire HPV infection in their lifetime. Genital warts tend to be benign and asymptomatic, and 90% are caused by HPV types 6 and 11. The HPV types most often linked to anogenital carcinoma are 16 and 18; HPV-16 is the most common.

Warts are usually described as flat and papular in the genital regions. Diagnosis of genital warts is usually made by clinical examination. If unclear, a biopsy may be performed. Treatment

