Venereal diseases (VDs) are contracted or transmitted through sexual contact. Commonly known as sexually transmitted diseases (STDs), VDs have various forms, including human papillomavirus (HPV), chlamydia, gonorrhea, herpes, human immunodeficiency virus (HIV), syphilis, and trichomoniasis. Because many STDs do not cause symptoms, sexually active individuals should undergo regular checkups and testing. If an individual has an STD, obtaining prompt treatment is crucial to managing the disease and preventing transmission.

Some VDs are curable with medications, while others are incurable. For example, STDs caused by bacteria, including gonorrhea, chlamydia, and syphilis, are cured typically with the administration of antibiotics. STDs caused by viruses, including HIV, herpes, and HPV, are not curable but can be treated to control symptoms.

The terms *sexually transmitted disease* and *sexually transmitted infection* (STI) are sometimes used interchangeably. In the medical sector, the term STI is often used instead of STD, because an infection does not always manifest symptoms or cause a disease. Therefore, the term STD is sometimes used when the infection has actually transformed into a disease.

The U.S. Centers for Disease Control and Prevention (CDC) publishes periodic treatment guidelines for STDs. For example, the CDC recommends oral azithromycin 1 g or oral doxycycline 100 mg twice daily at a frequency of seven days for adults and adolescents with uncomplicated chlamydial infections. Pregnant women with uncomplicated chlamydial infections may receive oral azithromycin 1 g or oral amoxicillin 500 mg thrice daily. Alternative medications, such as erythromycin, ofloxacin, and levofloxacin, may be used if the recommended regimens for chlamydia are not suitable for the patient. CDC recommendations are presented only as clinical guidelines and should not be used as clinical standards. Health care providers should consider and treat each patient on a case-by-case basis.

Continuing research on STDs has resulted in a marked improvement in the fight against these diseases. For example, advances in biopharmaceutical research have largely contributed to HIV infection’s becoming a severe, manageable condition rather than a death sentence.

**Infections, Diseases, and Treatments**

A number of antiviral medications are used to treat (though not cure) VDs caused by viral infections. Acyclovir (marketed as Zovirax) is one of the most frequently used antivirals for infection caused by the herpes simplex virus–2, which causes genital herpes. The drug works by slowing the growth and expansion of the virus in the body. Although the medication does not cure the virus, it can reduce symptoms of the infection. Acyclovir can be taken three to five times daily and is available in oral (pill and liquid), injectable, and topical forms. Acyclovir is given intravenously when the infection is more serious, such as in immune-compromised individuals or infants. Patients with kidney problems should be given lower doses.

Because acyclovir is regarded as a pregnancy category B drug, it is typically safe to take during pregnancy. The medication can be given during childbirth, because if the mother has an active lesion, the herpes virus can be transmitted to the newborn child during delivery. Although studies have shown that acyclovir is generally safe to use, it has been noted that it can cause potential harm to an infant if expelled into the breast milk of a lactating mother.

Like the herpes virus, acquired immune deficiency syndrome (AIDS) currently has no cure. However, there are many pharmaceuticals, known as antiretroviral drugs, that are used to
suppress the reproduction of HIV, the virus that causes AIDS. People with HIV infection can be treated with a combination of at least three drugs; this process is typically referred to as “highly active antiretroviral therapy.” These medications are used to lower the chance of the virus becoming resistant.

Nucleoside reverse transcriptase inhibitors (NRTIs) became available in 1987 and were the first available drugs to treat HIV infection. To have the ability to infect healthy cells and replicate itself in the body, HIV requires an enzyme called “reverse transcriptase.” NRTIs inhibit reverse transcriptase and stop HIV from infecting cells and reproducing itself. Nonnucleoside reverse transcriptase inhibitors (NNRTIs) were approved for the treatment of HIV infection in 1997. They serve the same purpose as NRTIs, except that they join in a different way to stop the duplication and spread of the virus in the body. First approved in 1995, protease inhibitors prevent protease, which is one of the digestive enzymes HIV uses to replicate itself. Protease inhibitors prevent the infection of new cells and slow the reproduction of the virus. Whereas NRTIs and NNRTIs affect only newly infected cells, protease inhibitors are also effective in cells that have been infected for a considerable amount of time. Fusion or entry inhibitors (such as enfuvirtide, marketed as Fuzeon) are the fourth and most recently approved group of antiretroviral drugs. Fuzeon works by blocking one of the proteins HIV carries, as well as slowing the duplication of the virus. Unlike the other three types of antiretroviral drugs that can be taken orally, Fuzeon is a protein, which can be digested in the stomach; therefore, it must be injected.

HPV, which is the most common VD in the United States, has no treatment. The virus can cause genital warts, which, if left untreated, may go away on their own, remain the same, or grow in size. Genital warts can be treated (by the patient) with podofilox solution or gel, imiquimod cream, or sinecatechins ointment. Provider-administered treatments include cryotherapy, podophyllin, and trichloroacetic or bichloroacetic acid.

Trichomoniasis, which is regarded as the most commonly curable STD in the United States, is caused by the protozoan parasite *Trichomonas vaginalis*. The infection can be cured with a single dose of metronidazole or tinidazole antibiotic pills.

Bacterial infections, such as gonorrhea, syphilis, and chlamydia, are generally curable and can be easily treated with the right antibiotic. Penicillin, the first type of antibiotic, was discovered in 1928 by Alexander Fleming. Since then, the number of antibiotics has grown to more than 100 in the United States. Gonorrhea, which is caused by the bacterium *Neisseria gonorrhoeae*, can be treated with one dose of ceftriaxone (marketed as Rocephin), which is typically administered as an injection in the arm. Depending on the patient, other options for treating gonorrhea may include azithromycin and doxycycline.

Syphilis, which is caused by the bacteria *Treponema pallidum*, is treatable with penicillin G benzathine (marketed as Bicillin). Depending on the severity of the disease, a single dose, double dose, or triple dose of the drug may be required. Individuals with neurosyphilis, a life-threatening disease that can develop if syphilis goes untreated, may be treated with aqueous crystalline penicillin or, alternatively, procaine penicillin and the gout treatment probenecid, which makes the penicillin more effective.

Penicillin allergies, such as skin rash, hives, and difficulty breathing, are the most frequently reported drug allergies. In such cases, an STD patient may need to avoid penicillin and a class of medications called cephalosporins, which are similar in structure to penicillin, is used instead. Depending on whether a patient is anaphylactic (has serious allergic reactions), he or
she may need to be treated with unrelated antibiotics.

Developing Studies on VD Treatments

A new drug has been developed to lower the rate of viral shedding in patients with genital herpes simplex virus–2. Viral shedding happens when a virus makes its way from the nerves up to the surface of the skin; during this process, the virus can be transmitted to others via skin-to-skin contact. The new herpes simplex virus drug, pritelivir, is designed to obstruct replication and lower the risk for transmission.

To improve HIV/AIDS treatment regimens, biopharmaceutical companies are concentrating on preventive vaccines and useful therapies that are currently in clinical trials or awaiting government approval. In the development stages are 44 vaccines and medications, including 25 antivirals, 16 vaccines, and 3 gene therapies. For example, potential therapies include “attachment inhibitors,” a new class of HIV drugs designed to safeguard cells from infection, and “gene modification,” which modifies the specific receptor that makes it easy for HIV to infect cells.

With more than 100 million new gonococcal infections around the world yearly, gonorrhea has made its way onto the CDC’s list of urgent threats. A study conducted in the United States revealed that a new gonorrhea treatment (based on an anticancer therapy) has successfully eliminated gonococcal infection from female mice and stopped reinfection. On the basis of the results of the animal-based study, researchers received the go-ahead to develop the technology needed to treat the disease and suppress reinfection.

See Also: AIDS/HIV Drugs; Antibiotic Revolution, The; Antibiotic/Antimicrobial Resistance; Antibiotics; Centers for Disease Control and Prevention; Disease Management; Food and Drug Administration (U.S.).

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