

Syphilis

Syphilis is a sexually transmitted infection (STI) caused by the spirochete *Treponema pallidum*. Known as the "great imitator," syphilis is notorious for its diverse and often subtle clinical manifestations, which can mimic other diseases, making the diagnosis challenging at times. The disease progresses through four distinct stages, including primary, secondary, tertiary, and latent. Each stage is characterized by varying symptoms and levels of infectivity. Syphilis is primarily transmitted through intimate contact with an infected lesion, but it can also be spread via blood transfusion or from mother to child during childbirth. If left untreated, syphilis can lead to significant morbidity, including damage to the cardiovascular and nervous systems. Early detection and treatment are critical to preventing the long-term consequences of the disease.

Epidemiology and Transmission

Syphilis remains a global public health concern, with rising incidence rates in certain populations, particularly men who have sex with men. In the United States, syphilis rates have increased in recent years, which highlights the need for enhanced prevention strategies.

The primary modes of transmission include:

- **Direct contact with infectious lesions:** The most common route of transmission, particularly through sexual activity.
- **Blood transfusion:** Although rare due to screening, syphilis can be transmitted through contaminated blood products.
- **Vertical transmission:** Pregnant women infected with syphilis can transmit the infection to their fetus during childbirth, which may result in congenital syphilis, leading to severe outcomes such as miscarriage, stillbirth, or lifelong disabilities.

Clinical Stages of Syphilis

Syphilis progresses through four stages, each with specific clinical features:

- **Primary Syphilis:** Primary syphilis typically presents 2-6 weeks after exposure as a painless ulcer, known as a *chancre*, at the site of infection. The chancre most commonly appears on the genitalia but can also develop on other mucosal surfaces such as the mouth, anus, or even extragenital areas like the fingers or nipples. The lesion is typically round, firm, and non-tender, and may have raised, hardened borders. Regional lymphadenopathy is often present. The chancre can heal without treatment within 1-4 weeks, but the infection persists in the body.

- **Secondary Syphilis:** Secondary syphilis follows a few weeks after the primary lesion heals. This stage is characterized by systemic symptoms such as fever, malaise, and a generalized rash. The rash is distinctive for its presence on the palms of the hands and soles of the feet, though it can also involve other parts of the body, including the mucous membranes of the mouth and genitalia. The rash can be maculopapular, pustular, or scaly, and may evolve into more complex lesions such as *condylomata lata*—flat, moist, and warty lesions typically found in the groin and axilla. These lesions are highly infectious, as they are teeming with *T. pallidum*. Other symptoms of secondary syphilis may include patchy hair loss, mucosal erosions, and generalized lymphadenopathy. This stage is highly contagious.
- **Tertiary Syphilis:** Tertiary syphilis can develop 5-20 years after the initial infection, and often occurs in individuals who have not received adequate treatment. This stage is marked by the formation of *gummas*, which are soft, tumor-like growths that can appear in the skin, bones, or internal organs. Tertiary syphilis can lead to severe complications, including cardiovascular syphilis (e.g., aortic aneurysm) and neurosyphilis (e.g., dementia, blindness, or hearing loss). Tertiary lesions are typically nodular, ulcerative, and may scar once healed. Neuropsychiatric symptoms may occur, including cognitive impairment, psychiatric disturbances, and dementia-like manifestations.
- **Latent Syphilis:** Latent syphilis occurs after the secondary stage and is characterized by a period of clinical inactivity, where no symptoms are present. However, the bacteria is still present in the body, and the individual can still test positive for syphilis. Latent syphilis can last for years, and while patients do not exhibit symptoms, the infection remains contagious during the early part of this phase, especially in the first year. Late latent syphilis, which occurs after more than one year, is typically non-contagious.

Diagnosis

Syphilis is diagnosed based on clinical findings and serological testing. The initial screening is typically performed using non-treponemal tests, such as the rapid plasma reagin (RPR) or Venereal Disease Research Laboratory (VDRL) test, which detect antibodies that are produced in response to lipid antigens released by cells damaged by *T. pallidum*. These tests can detect syphilis early in infection but may yield false positives, particularly in individuals with autoimmune diseases or pregnant females.

Treponemal tests, such as the fluorescent treponemal antibody absorption test or the Treponema pallidum particle agglutination test, confirm the diagnosis by detecting antibodies specific to *T. pallidum*. In some cases, direct examination of a chancre or mucosal lesion via darkfield microscopy can identify the spirochete directly. If tertiary syphilis or neurosyphilis is suspected, additional tests such as lumbar puncture, cerebrospinal fluid analysis, and neuroimaging may be required to assess the involvement of the central nervous system.

Treatment

Penicillin G remains the treatment of choice for all stages of syphilis, as *T. pallidum* has not developed resistance to this antibiotic. The recommended dosage varies depending on the stage of syphilis:

- **Primary, secondary, and early latent syphilis:** Single intramuscular dose of 2.4 million units of penicillin G.
- **Late latent syphilis or tertiary syphilis (without neurosyphilis):** Three doses of 2.4 million units of penicillin G administered at weekly intervals.
- **Neurosyphilis:** A more intensive regimen, usually intravenous penicillin G for 10-14 days.

For patients with penicillin allergy, alternatives such as tetracycline, doxycycline, or ceftriaxone may be used, although these are generally considered less effective. In cases of congenital syphilis, appropriate treatment should be initiated promptly to prevent long-term complications in the newborn.

Prevention

Prevention of syphilis relies on safe sexual practices, including the consistent use of condoms and reducing the number of sexual partners. Regular screening for syphilis is recommended for individuals at high risk, such as sexually active men who have sex with men, individuals with HIV, and those with multiple sexual partners. Early detection and treatment are crucial for preventing complications and reducing transmission rates.

Conclusion

Syphilis is a serious but treatable STI that progresses through distinct stages, each with unique clinical features. Early detection and timely treatment with penicillin are essential for preventing the severe complications associated with tertiary syphilis. As syphilis continues to be a public health concern, continued emphasis on prevention, screening, and education is crucial to reduce the burden of this disease.

References

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- ❖ Workowski, K. A., & Bolan, G. A. (2015). *Sexually transmitted diseases treatment guidelines, 2015*. MMWR. Recommendations and Reports, 64(3), 1-137. <https://doi.org/10.15585/mmwr.rr6403a1>