

destructive, ulcerative lesions. Gummas are rare because of the use of effective antibiotics.

**Congenital Syphilis.** Congenital syphilis occurs most frequently during maternal primary or secondary syphilis, when the spirochetes are most numerous. Intrauterine death and perinatal death each occurs in approximately 25% of cases of untreated congenital syphilis.

Manifestations of congenital syphilis are divided into those that occur in the first 2 years of life (infantile syphilis) and those that occur later (tardive syphilis). Infantile syphilis is often manifested by nasal discharge and congestion (snuffles) in the first few months of life. A desquamating or bullous rash can lead to sloughing of the skin, particularly of the hands and feet and around the mouth and anus. Hepatomegaly and skeletal abnormalities are common. Late manifestations develop in nearly half of untreated children with neonatal syphilis.

**Serologic Tests for Syphilis.** Serology remains the mainstay of diagnosis of syphilis. Serologic tests include nontreponemal antibody tests and antitreponemal antibody tests. Nontreponemal tests measure antibody to cardiolipin, a phospholipid present in both host tissues and *T. pallidum*. These antibodies are detected in the rapid plasma reagin (RPR) and Venereal Disease Research Laboratory (VDRL) tests. Treponemal antibody tests measure antibodies that specifically react with *T. pallidum*. These include the fluorescent treponemal antibody absorption test and the *T. pallidum* enzyme immunoassay test.

The use of these tests is complex because of differences in the antibody responses they measure and imperfections in the tests.

- Both treponemal and nontreponemal tests are only moderately sensitive (~70%-85%) for primary syphilis.
- Both types of tests are very sensitive (>95%) for secondary syphilis.
- Treponemal tests are very sensitive for tertiary and latent syphilis. In contrast, nontreponemal antibody titers fall with time and so nontreponemal tests are somewhat less sensitive for tertiary or latent syphilis.
- Nontreponemal antibody levels fall with successful treatment of syphilis, and so changes in the titers detected in these tests can be used to monitor therapy.
- Treponemal tests, which are nonquantitative, remain positive even after successful therapy.
- Both nontreponemal and treponemal tests can be used to screen for syphilis, but positive results should be confirmed using a test of the other type (e.g., confirm nontreponemal positive test results with a treponemal test). Confirmatory testing is needed because false-positive results can occur in both nontreponemal and treponemal tests. Causes of false-positive results in these tests include pregnancy, autoimmune diseases, and infections other than syphilis.

## MORPHOLOGY

**In primary syphilis a chancre occurs on the penis or scrotum of 70% of men and on the vulva or cervix of 50% of women.** The chancre is a slightly elevated, firm, reddened



**Figure 8-35** Syphilitic chancre in the scrotum (see Fig. 8-35 for the histopathology of syphilis). (Courtesy Dr. Richard Johnson, Beth Israel-Deaconess Hospital, Boston, Mass.)

papule, up to several centimeters in diameter, that erodes to create a clean-based shallow ulcer. The contiguous induration creates a button-like mass directly adjacent to the eroded skin, providing the basis for the designation hard chancre (Fig. 8-35). On histologic examination, the chancre contains an intense infiltrate of plasma cells, with scattered macrophages and lymphocytes and a proliferative endarteritis. The endarteritis starts with endothelial cell activation and proliferation and progresses to intimal fibrosis (Fig. 8-5). The regional nodes are usually enlarged due to nonspecific acute or chronic lymphadenitis, plasma cell-rich infiltrates, or granulomas.

**In secondary syphilis widespread mucocutaneous lesions involve the oral cavity, palms of the hands, and soles of the feet.** The rash frequently consists of discrete red-brown macules less than 5 mm in diameter, but it may be follicular, pustular, annular, or scaling. Red lesions in the mouth or vagina contain the most organisms and are the most infectious. Histologically, the mucocutaneous lesions of secondary syphilis show the same plasma cell infiltrate and obliterative endarteritis as the primary chancre, although the inflammation is often less intense.

**Tertiary syphilis most frequently involves the aorta; the CNS; and the liver, bones, and testes.** The aortitis is caused by endarteritis of the vasa vasorum of the proximal aorta. Occlusion of the vasa vasorum results in scarring of the media of the proximal aortic wall, causing a loss of elasticity. There may be narrowing of the coronary artery ostia caused by sub-intimal scarring with resulting myocardial ischemia. The morphologic and clinical features of syphilitic aortitis are discussed in greater detail with diseases of the blood vessels (Chapter 11).

**Neurosyphilis** takes one of several forms, designated meningovascular syphilis, tabes dorsalis, and general paresis (Chapter 28).