



Figure 8-25 The natural history and spectrum of tuberculosis. (Adapted from a sketch provided by Professor R.K. Kumar, The University of New South Wales, School of Pathology, Sydney, Australia.)

it was in past years; hence, all newly diagnosed cases in the United States are treated with at least four drugs, unless the susceptibility of the bacterium from the source case is known. The prognosis is generally good if infections are localized to the lungs, except when they are caused by drug-resistant strains or occur in aged, debilitated, or immunosuppressed individuals, who are at high risk for developing extrapulmonary tuberculosis as well as progression of pulmonary disease.

All stages of HIV infection are associated with an increased risk of tuberculosis. The use of HAART reduces the risk of tuberculosis in people with HIV infection, but even with HAART, people infected with HIV are more likely to develop symptomatic tuberculosis. A low CD4 count before starting HAART is an important risk factor for development of tuberculosis, which underscores the role of the immune response in keeping reactivation of *M. tuberculosis* in check. Pulmonary manifestations of tuberculosis in HIV-infected individuals are extremely variable, ranging from focal lesions to multifocal infiltrates to localized apical disease with cavitation. The extent of immunodeficiency also determines the frequency of extrapulmonary involvement, rising from 10% to 15% in mildly immunosuppressed people to greater than 50% in those with severe immune deficiency. Other atypical features of tuberculosis

in HIV-positive people include an increased frequency of false-negative sputum smears and tuberculin tests (the latter sometimes referred to as “anergy”), and the absence of characteristic granulomas in tissues, particularly in the late stages of HIV. The increased frequency of sputum smear-negativity is paradoxical because these immunosuppressed patients typically have higher bacterial loads. The likely explanation is that cavitation and bronchial damage are more severe in immunocompetent individuals, resulting in more bacilli in expelled sputum. In contrast, the absence of bronchial wall destruction due to reduced T-cell-mediated hypersensitivity results in the excretion of fewer bacilli in the sputum.

MORPHOLOGY

Primary Tuberculosis. In countries where consumption of infected milk has been eliminated, primary tuberculosis almost always begins in the lungs. Typically, the inhaled bacilli implant in the distal airspaces of the lower part of the upper lobe or the upper part of the lower lobe, usually close to the pleura. As sensitization develops, a 1- to 1.5-cm area of gray-white inflammation with consolidation emerges, known as the Ghon focus. In most cases, the center of this focus undergoes caseous