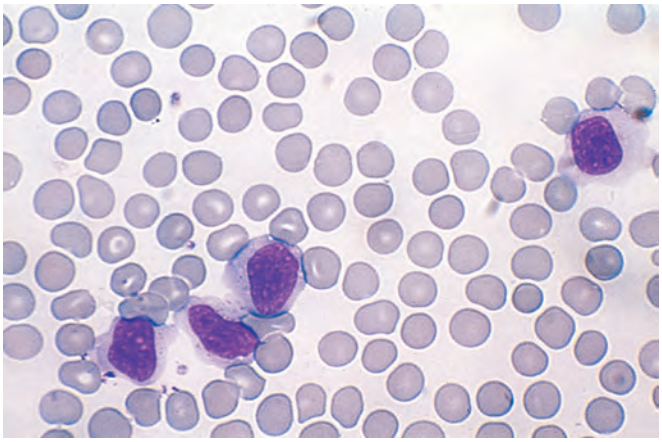

Figure 8-14 Atypical lymphocytes in infectious mononucleosis.

latency-specific genes can also be detected in the paracortex using specific antibodies. EBV-infected B cells resembling Reed-Sternberg cells (the malignant cells of Hodgkin lymphoma, Chapter 13) may be found. B-cell areas (follicles) may also show mild hyperplasia. The T-cell proliferation is sometimes so exuberant that it is difficult to distinguish the nodal morphology from that seen in malignant lymphomas. Similar changes commonly occur in the tonsils and lymphoid tissue of the oropharynx.

The **spleen** is enlarged in most cases, weighing between 300 and 500 gm. It is usually soft and fleshy, with a hyperemic cut surface. The histologic changes are analogous to those of the lymph nodes, showing an expansion of white pulp follicles and red pulp sinusoids due to the presence of numerous activated T cells. These spleens are especially vulnerable to rupture, possibly in part because the rapid increase in size produces a tense, fragile splenic capsule.

The **liver** is usually involved to some degree, although hepatomegaly is at most moderate. On histologic examination, atypical lymphocytes are seen in the portal areas and sinusoids, and scattered, isolated cells or foci of parenchymal necrosis may be present. This histologic picture is similar to that of other forms of viral hepatitis.

Clinical Features. EBV in young children classically presents with fever, sore throat, lymphadenitis, and the other features mentioned earlier. However, malaise, fatigue, and lymphadenopathy are the common presentation in young adults with infectious mononucleosis and can raise the specter of leukemia or lymphoma; EBV also can present as a fever of unknown origin without significant lymphadenopathy or other localized findings, hepatitis resembling one of the hepatotropic viral syndromes, or a febrile rash resembling rubella**. The diagnosis depends on the following findings (in increasing order of specificity): (1) lymphocytosis with the characteristic atypical lymphocytes in the peripheral blood, (2) a positive heterophile antibody reaction (Monospot test), and (3) a rising titer of specific antibodies for EBV antigens (viral capsid antigens, early antigens, or Epstein-Barr nuclear antigen).** In most patients, infectious mononucleosis resolves within 4 to 6 weeks, but sometimes the fatigue lasts longer. One or more complications occasionally supervene. Perhaps most common is marked hepatic dysfunction with jaundice, elevated hepatic enzyme levels, disturbed appetite, and rarely, even liver failure. Other complications involve the nervous system, kidneys, bone marrow, lungs, eyes, heart, and spleen. Splenic rupture can occur even with minor trauma, leading to hemorrhage that may be fatal.

A more serious complication in those lacking T-cell immunity, such as HIV-infected individuals, or individuals receiving immunosuppressive therapy (e.g., bone marrow or solid-organ transplant recipients), is unimpeded B-cell proliferation. This process can be initiated by an acute infection or reactivation of latent B cell infection and usually begins as polyclonal B-cell proliferation that transforms to monoclonal B-cell lymphoma. As detailed in Chapter 13, EBV also causes another distinctive form of lymphoma, called *Burkitt lymphoma*, particularly in certain geographic locales.

Serious consequences of EBV infection occur in individuals suffering from the X-linked lymphoproliferation syndrome (also known as *Duncan disease*), a disorder caused by mutations in the *SH2D1A* gene, which encodes a signaling protein that participates in T-cell and NK-cell activation and antibody production. This rare inherited immunodeficiency is characterized by an ineffective immune response to EBV. Patients are usually normal until they are acutely infected with EBV, often during adolescence. In more than half of the cases, EBV causes an acute overwhelming infection that may be fatal. Others succumb to EBV-positive B-cell lymphoma or infections related to hypogammaglobulinemia.

Bacterial Infections

Different classes of bacteria are responsible for diverse infections (Table 8-7).

Gram-Positive Bacterial Infections

Common gram-positive pathogens include *Staphylococcus*, *Streptococcus*, and *Enterococcus*, each of which causes many types of infections. Diphtheria, listeriosis, anthrax, and nocardiosis are less common infections also caused by gram-positive rods and discussed here. *Clostridia* are discussed with the anaerobes.

Staphylococcal Infections

***S. aureus* causes a myriad of skin lesions (boils, carbuncles, impetigo, and scalded-skin syndrome) as well as abscesses, sepsis, osteomyelitis, pneumonia, endocarditis, food poisoning, and toxic shock syndrome** (Fig. 8-15). *S. aureus* are pyogenic gram-positive cocci that form clusters resembling bunches of grapes. The general characteristics of *S. aureus* infection are reviewed here. Specific organ infections are described in other chapters. Coagulase-negative staphylococci, such as *S. epidermidis*, cause opportunistic infections in catheterized patients, patients with prosthetic cardiac valves, and drug addicts. *S. saprophyticus* is a common cause of urinary tract infections in young women.

Pathogenesis. *S. aureus* produces a multitude of virulence factors, which include surface proteins involved in adherence and evasion of the host immune response, secreted