

**Table 6-16** AIDS-Defining Opportunistic Infections and Neoplasms Found in Patients with HIV Infection

<b>Infections</b>
<b>Protozoal and Helminthic Infections</b>
Cryptosporidiosis or isosporidiosis (enteritis)
Pneumocystosis (pneumonia or disseminated infection)
Toxoplasmosis (pneumonia or CNS infection)
<b>Fungal Infections</b>
Candidiasis (esophageal, tracheal, or pulmonary)
Cryptococcosis (CNS infection)
Coccidioidomycosis (disseminated)
Histoplasmosis (disseminated)
<b>Bacterial Infections</b>
Mycobacteriosis ("atypical," e.g., <i>Mycobacterium avium-intracellulare</i> , disseminated or extrapulmonary; <i>Mycobacterium tuberculosis</i> , pulmonary or extrapulmonary)
Nocardiosis (pneumonia, meningitis, disseminated)
<i>Salmonella</i> infections, disseminated
<b>Viral Infections</b>
Cytomegalovirus (pulmonary, intestinal, retinitis, or CNS infections)
Herpes simplex virus (localized or disseminated infection)
Varicella-zoster virus (localized or disseminated infection)
Progressive multifocal leukoencephalopathy
<b>Neoplasms</b>
Kaposi sarcoma
Primary lymphoma of brain
Invasive cancer of uterine cervix

CNS, Central nervous system.

or four drugs that block different steps of the HIV life cycle. A brief summary of selected opportunistic infections is provided here.

- Approximately 15% to 30% of untreated HIV-infected people develop pneumonia at some time during the course of the disease, caused by the fungus *Pneumocystis jiroveci* (reactivation of a prior latent infection). Before the advent of HAART, this infection was the presenting feature in about 20% of cases, but the incidence is much less in patients who respond to HAART.
- Many patients present with an opportunistic infection other than *P. jiroveci* pneumonia. Among the most common pathogens are *Candida*, cytomegalovirus, atypical and typical mycobacteria, *Cryptococcus neoformans*, *Toxoplasma gondii*, *Cryptosporidium*, herpes simplex virus, papovaviruses, and *Histoplasma capsulatum*.
- *Candidiasis* is the most common fungal infection in patients with AIDS, and infection of the oral cavity, vagina, and esophagus are its most common clinical manifestations. In asymptomatic HIV-infected individuals oral candidiasis is a sign of immunologic decompensation, and it often heralds the transition to AIDS. Invasive candidiasis is infrequent in patients with AIDS, and it usually occurs when there is drug-induced neutropenia or use of indwelling catheters.
- *Cytomegalovirus* may cause disseminated disease, although, more commonly, it affects the eye and gastrointestinal tract. Chorioretinitis was seen in approximately 25% of patients before the advent of HAART, but this has decreased dramatically after the initiation of HAART. Cytomegalovirus retinitis occurs almost exclusively in patients with CD4+ T cell counts less than 50 per microliter. Gastrointestinal disease, seen in 5% to 10% of cases, manifests as esophagitis and colitis, the latter associated with multiple mucosal ulcerations.
- Disseminated bacterial infection with *atypical mycobacteria* (mainly *Mycobacterium avium-intracellulare*) also occurs late, in the setting of severe immunosuppression. Coincident with the AIDS epidemic, the incidence of tuberculosis has risen dramatically. Worldwide, almost a third of all deaths in AIDS patients are attributable to tuberculosis, but this complication remains uncommon in the United States. Patients with AIDS have reactivation of latent pulmonary disease as well as outbreaks of primary infection. In contrast to infection with atypical mycobacteria, *M. tuberculosis* manifests itself early in the course of AIDS. As with tuberculosis in other settings, the infection may be confined to lungs or may involve multiple organs. The pattern of expression depends on the degree of immunosuppression; dissemination is more common in patients with very low CD4+ T-cell counts. Most worrisome are reports indicating that a growing number of isolates are resistant to multiple antimycobacterial drugs.
- *Cryptococcosis* occurs in about 10% of AIDS patients. As in other settings with immunosuppression, meningitis is the major clinical manifestation of cryptococcosis. *Toxoplasma gondii*, another frequent invader of the central nervous system in AIDS, causes encephalitis and is responsible for 50% of all mass lesions in the central nervous system.
- *JC virus*, a human papovavirus, is another important cause of central nervous system infections in HIV-infected patients. It causes progressive multifocal leukoencephalopathy (Chapter 28). *Herpes simplex virus infection* is manifested by mucocutaneous ulcerations involving the mouth, esophagus, external genitalia, and perianal region. *Persistent diarrhea*, which is common in untreated patients with advanced AIDS, is often caused by infections with protozoans such as *Cryptosporidium*, *Isospora belli*, or microsporidia. These patients have chronic, profuse, watery diarrhea with massive fluid loss. Diarrhea may also result from infection with enteric bacteria, such as *Salmonella* and *Shigella*, as well as *M. avium-intracellulare*.

**Tumors.** Patients with AIDS have a high incidence of certain tumors, especially *Kaposi sarcoma (KS)*, B-cell lymphoma, cervical cancer in women, and anal cancer in men. It is estimated that 25% to 40% of untreated HIV-infected individuals will eventually develop a malignancy. A common feature of these tumors is that they are caused by oncogenic DNA viruses, specifically Kaposi sarcoma herpesvirus (Kaposi sarcoma), EBV (B-cell lymphoma), and human papillomavirus (cervical and anal carcinoma). Even in healthy people, any of these viruses may establish latent infections that are kept in check by a competent immune system. The increased risk of malignancy in AIDS patients exists mainly because of failure to contain the infections and reactivation of the viruses, as well as decreased immunity against the tumors.

**Kaposi Sarcoma.** Kaposi sarcoma, a vascular tumor that is otherwise rare in the United States, is the most common