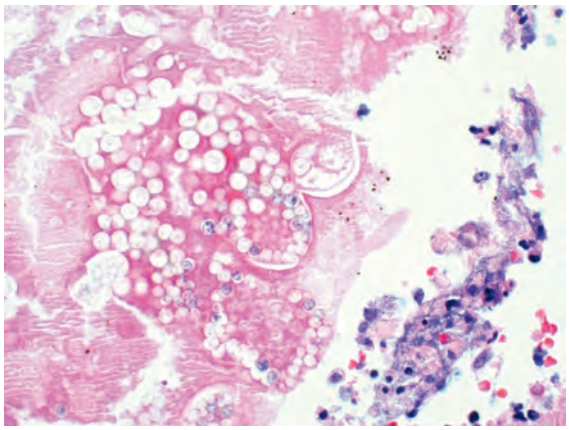

Figure 15-39 Coccidioidomycosis. Intact and ruptured spherules are seen.

Pneumonia in the Immunocompromised Host

The appearance of a pulmonary infiltrate, with or without signs of infection (e.g., fever), is one of the most common and serious complications in patients whose immune defenses are suppressed by disease, immunosuppressive therapy for organ or hematopoietic stem cell transplants, chemotherapy for tumors, or irradiation. A wide variety of so-called opportunistic infectious agents, many of which rarely cause infection in normal hosts, can cause these pneumonias, and often more than one agent is involved. Mortality from these opportunistic infections is high. Table 15-8 lists some of the opportunistic agents according to their prevalence and whether they cause local or diffuse pulmonary infiltrates. The differential diagnosis of such infiltrates includes drug reactions and involvement of the lung by tumor. The specific infections are discussed in Chapter 8. Of these, the ones that commonly involve the lung can be classified according to the etiologic agent: (1) bacteria (*P. aeruginosa*, *Mycobacterium* species, *L. pneumophila*, and *Listeria monocytogenes*), (2) viruses (cytomegalovirus [CMV] and herpesvirus), and (3) fungi (*P. jiroveci*, *Candida* species, *Aspergillus* species, the Phycomycetes, and *Cryptococcus neoformans*).

Table 15-8 Causes of Pulmonary Infiltrates in Immunocompromised Hosts

Diffuse Infiltrates	Focal Infiltrates
Common	
Cytomegalovirus *Pneumocystis jiroveci* Drug reaction	Gram-negative bacterial infections *Staphylococcus aureus* *Aspergillus* *Candida* Malignancy
Uncommon	
Bacterial pneumonia *Aspergillus* *Cryptococcus* Malignancy	*Cryptococcus* *Mucor* *Pneumocystis jiroveci* *Legionella pneumophila*

Pulmonary Disease in Human Immunodeficiency Virus Infection

Pulmonary disease accounts for 30% to 40% of hospitalizations in HIV-infected individuals. Although the use of potent antiretroviral agents and effective chemoprophylaxis has markedly altered the incidence and outcome of pulmonary disease in HIV-infected persons, the plethora of infectious agents and other pulmonary lesions make diagnosis and treatment a distinct challenge. Some of the individual microbial agents afflicting HIV-infected individuals have already been discussed; this section focuses only on the general principles of HIV-associated pulmonary disease.

- Despite the emphasis on opportunistic infections, it must be remembered that bacterial lower respiratory tract infections caused by the "usual" pathogens is one are among the most serious pulmonary disorders in HIV infection. The implicated organisms include *S. pneumoniae, S. aureus, H. influenzae,* and gram-negative rods. Bacterial pneumonias in HIV-infected persons are more common, more severe, and more often associated with bacteremia than in those without HIV infection.
- Not all pulmonary infiltrates in HIV-infected individuals are infectious in etiology. A host of noninfectious diseases, including Kaposi sarcoma (Chapters 6 and 11), non-Hodgkin lymphoma (Chapter 13), and lung cancer, occur with increased frequency and must be excluded.
- The CD4+ T-cell count determines the risk of infection with specific organisms. As a rule of thumb, bacterial and tubercular infections are more likely at higher CD4+ counts (>200 cells/mm^3). *Pneumocystis* pneumonia usually strikes at CD4+ counts less than 200 cells/mm^3, while cytomegalovirus, fungal, and *Mycobacterium avium* complex infections are uncommon until the very late stages of immunosuppression (CD4+ counts less than 50 cells/mm^3).

Finally, pulmonary disease in HIV-infected persons may result from more than one cause, and even common pathogens may present with atypical manifestations. Therefore, the diagnostic work-up of these patients may be more extensive (and expensive) than would be necessary in an immunocompetent individual.

Lung Transplantation

Indications for transplantation may include almost all nonneoplastic terminal lung diseases, provided that the patient does not have any other serious disease, which would preclude lifelong immunosuppressive therapy. The most common indications are end-stage emphysema, idiopathic pulmonary fibrosis, cystic fibrosis, and idiopathic/familial pulmonary arterial hypertension. While bilateral lung and heart-lung transplants are possible, in many cases a single-lung transplant is performed, offering sufficient improvement in pulmonary function for two recipients from a single (and all too scarce) donor. When bilateral chronic infection is present (e.g., cystic fibrosis, bronchiectasis),