7  Chest Radiology in AIDS

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7.1 Introduction

Human immune deficiency virus (HIV) infection is a heterogeneous condition whose most advanced expression, AIDS, is associated with a number of well-characterized opportunistic infections and neoplasms. However, clinically asymptomatic HIV infection accounts for a longer duration of HIV infection than does symptomatic AIDS, except for a minority of patients who progress rapidly to AIDS. Although asymptomatic HIV-infected patients do not have AIDS-related opportunistic infections or CD4 cell counts of less than 200 cells/mm³, they do have demonstrable immunologic abnormalities. Another interesting group of HIV-infected patients have experienced substantial immune reconstitution as a result of highly active antiretroviral therapy (HAART). These patients generally have very low CD4 cell counts, which rise during treatment with HAART (PALELLA et al. 1998). The newly reconstituted CD4 cell count seems to protect against the opportunistic infections that occur with lower CD4 cell counts (SCHNEIDER et al. 1999). Paradoxically, some patients develop localized inflammatory reactions soon after HAART is begun, as the viral load is abruptly decreasing. These “immune reconstitution phenomena” are often targeted against a preexisting infection such as tuberculosis (NARITA et al. 1998) or Mycobacterium avium complex infection (RACE et al. 1998).

HIV-infected patients without AIDS have subtle immunologic derangements which coexist alongside the usual risk factors for lung disease. The interplay between the patient's perturbed immune system and various infectious agents and environmental factors likely accounts for the variety of cardiopulmonary manifestations increasingly linked to HIV infection. Bacterial pneumonia, tuberculosis, cardiomyopathy (BARBARO et al. 1998), pulmonary hypertension (OPRAVIL et al. 1997), lymphocytic interstitial pneumonitis (TRAVIS et al. 1992), and emphysema (DIAZ et al. 2000) are all linked to HIV but do not occur at a predictable level of immune dysfunction.
<table>
<thead>
<tr>
<th>Clinical setting</th>
<th>Condition</th>
<th>Radiographic findings</th>
<th>Epidemiology and associations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Common</strong></td>
<td><strong>Pneumocystis carinii pneumonia</strong></td>
<td>Bilateral symmetric, perihilar granular, reticular or airspace opacities</td>
<td>Very common in USA, Prevented by antibiotic prophylaxis</td>
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<td></td>
<td>Cryptococcosis</td>
<td>Single/multiple nodules, consolidation, +/- cavitiation</td>
<td>Common in USA and developing countries, Meningitis far more common</td>
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<tr>
<td></td>
<td>Histoplasmosis <em>a</em></td>
<td>Normal or diffuse, small, ≤3 mm lung nodules</td>
<td>Endemic: Ohio, Mississippi River valleys, Caribbean, Central America</td>
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<tr>
<td></td>
<td>Coccidioidomycosis <em>a</em></td>
<td>Diffuse nodular or reticulonodular parenchymal opacities</td>
<td>Desert of southwest USA, parts of South America</td>
</tr>
<tr>
<td></td>
<td>Penicilliosis <em>a</em></td>
<td>Localized diffuse reticular opacities, consolidation</td>
<td>Southeast Africa, associated with characteristic skin lesions</td>
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<td><strong>Less common</strong></td>
<td>Nocardiosis</td>
<td>Large consolidation, diffuse interstitial pattern, mass, +/- cavitiation</td>
<td>Southern USA, rural areas</td>
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<tr>
<td><strong>Uncommon</strong></td>
<td>Toxoplasmosis</td>
<td>Bilateral coarse nodular and reticulonodular opacities</td>
<td>Europe, cat exposure</td>
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<td></td>
<td>Rhodococcosis</td>
<td>Dense consolidation, cavitation, pleural effusion, empyema</td>
<td>Present in soil, causes disease in farm animals, Reservoir in cats</td>
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<td>Bacillary angiomatosis</td>
<td>Endobronchial lesions, parenchymal nodules, lymphadenoma</td>
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<td></td>
<td>Blastomycosis</td>
<td>Focal airspace opacities or masses</td>
<td>Midwest, South Central USA</td>
</tr>
<tr>
<td><strong>Subsequent opportunistic infection seen in long standing advanced HIV</strong></td>
<td>Aspergillosis</td>
<td>Chronic necrotizing: thick-walled cavity, Disseminated disease: bilateral nodules/masses</td>
<td>Preexisting lung disease, Steroids, neutropenia, antibiotics</td>
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<td></td>
<td>Cryptomegalovirus <em>Pseudomonas, other gram-negative pneumonia</em></td>
<td>Reticular, reticulonodular opacities, Consolidation, cavitation</td>
<td></td>
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<td></td>
<td>Kaposi's sarcoma</td>
<td>Coarsening bronchovascular bundles, ill-defined nodules with perihilar predominance</td>
<td>Seropositive for HHV-8, Male homosexual, Africa</td>
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<td></td>
<td>Strongyloidiasis</td>
<td>Hyperinfection syndrome: bilateral miliary nodules, reticular interstitial opacities</td>
<td>Tropical, subtropical regions</td>
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<td></td>
<td><em>Mycobacterium avium complex</em></td>
<td>Lymphadenopathy, parenchymal consolidation, small or large pulmonary nodules, +/- cavitiation</td>
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<td></td>
<td>Nontuberculous mycobacteria</td>
<td>Similar to tuberculosis</td>
<td></td>
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<td><strong>Any CD4</strong></td>
<td>Tuberculosis</td>
<td>Consolidation, nodules, lymphadenopathy, cavitation infrequent at low CD4, +/- pleural effusions</td>
<td>Prior exposure, Developing countries</td>
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<tr>
<td></td>
<td>Bacterial pneumonia</td>
<td>Lobar consolidation - cardiac silhouette Pulmonary venous congestion</td>
<td>Smoking, intravenous drug use, Infection with cardiotropic viruses</td>
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<tr>
<td></td>
<td>Cardiomyopathy <em>a</em></td>
<td>Enlarged central pulmonary arteries</td>
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<td>Pulmonary hypertension</td>
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<td></td>
<td>Emphysema (precoceous)</td>
<td>Severe emphysema</td>
<td>Smoking</td>
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<td></td>
<td>Lymphoma</td>
<td>Lung nodules and masses Pleural effusions</td>
<td>Epstein-Barr virus infection</td>
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*Occurs in persons who have resided in endemic areas