Currently, the following techniques are used to support the diagnosis, assess the severity, and monitor the course and response to treatment in patients with interstitial lung disease:

1. Gallium-67 scanning
2. Thallium-201 imaging
3. Positron emission tomography (PET)
4. Magnetic resonance imaging (MRI)
5. High-resolution computed tomography (HRCT)

**Gallium-67 citrate** is a radiopharmaceutical agent that is injected intravenously. It is excreted predominately by the gastrointestinal tract. Gallium selectively accumulates in areas of infection, inflammation, and neoplasm. The test has been used to evaluate adenopathy and parenchymal disease caused by sarcoidosis. Leung et al. showed a significant correlation between the intensity of gallium uptake and the extent of nodular disease or parenchymal consolidation. It is also helpful in assessment of the extent of extrathoracic sarcoidosis, and it could also be of diagnostic value if Panda or Lambda signs are detected (Figure 3.1).

**Thallium-201 chloride**, another radiopharmaceutical agent, is occasionally used in diagnosing pulmonary disease. It is most often used for cardiac imaging, for instance if myocardial sarcoidosis is suspected. It also accumulates in active neoplastic tissue. In an HIV patient an irregular reticulo-nodular-interstitial thallium uptake strongly suggests Kaposi sarcoma.

**Positron emission tomography** using fluorodeoxyglucose is helpful in detecting metabolically active lesions, neoplasms, infections, and noninfectious inflammation. Unfortunately, PET has had little success in evaluating interstitial lung disease.

**Magnetic resonance imaging**, unlike nuclear imaging or computed tomography, does not use ionizing radiation. It uses radiofrequency energy and an external magnetic field to induce signal from mobile protons in the body (usually hydrogen in water, fat, and other biomolecules). Large lesions such as lung carcinoma and pneumonia are easily visualized with MRI, but the subtle findings of interstitial lung disease are generally beyond MRI resolution. MRI, however, has been used successfully in the evaluation of asbestosis and progressive massive fibrosis due to silicosis. MRI delineates the extrapulmonary manifestations of interstitial lung disease including pleural plaques and mediastinal adenopathy.

**High-resolution computed tomography** is the most useful technique for evaluating interstitial lung disease. The procedure uses very-thin-section (1.0 to 1.5 mm) tomography and constructs images on a computer with a high spatial frequency reconstruction algorithm. Although HRCT is done without intravenous contrast agents, some institutions prefer to perform conventional computed tomography of the chest immediately after HRCT. This allows for the diagnosis of other lesions, particularly lung cancer that might coexist with interstitial lung fibrosis.
HRCT is the only radiological method that can visualize details of the secondary pulmonary lobule, the smallest lung unit that is covered with connective tissue layer. HRCT interpretation depends on understanding of its anatomy (Figure 3.2). The HRCT features of interstitial lung disease include intra- (Figure 3.3) and interlobular septal thickening (Figure 3.4), nodularity (Figure 3.5a, b), central peribronchovascular thickening (Figure