307 Diagnostic Procedures in Respiratory Disease

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The diagnostic modalities available for assessing the patient with suspected or known respiratory system disease include imaging studies and techniques for acquiring biologic specimens, some of which involve direct visualization of part of the respiratory system. Methods to characterize the functional changes developing as a result of disease, including pulmonary function tests and measurements of gas exchange, are discussed in **Chap. 306e**.

IMAGING STUDIES

ROUTINE RADIOGRAPHY

Routine chest radiography, including both posteroanterior (PA) and lateral views, is an integral part of the diagnostic evaluation of diseases involving the pulmonary parenchyma, the pleura, and, to a lesser extent, the airways and the mediastinum **(see Chaps. 305 and 308e)**. Lateral decubitus views are useful for determining whether pleural abnormalities represent freely flowing fluid, whereas apical lordotic views can visualize disease at the lung apices better than the standard PA view. Portable equipment is often used for acutely ill patients who cannot be transported to a radiology suite but are more difficult to interpret owing to several limitations: (1) the single anteroposterior (AP) projection obtained; (2) variability in over- and underexposure of film; (3) a shorter focal spot-film distance leading to lack of edge sharpness and loss of fine detail; and (4) magnification of the cardiac silhouette and other anterior structures by the AP projection. Common radiographic patterns and their clinical correlates are reviewed in **Chap. 308e**.

Advances in computer technology have allowed the development of digital or computed radiography, which has several benefits: (1) immediate availability of the images; (2) significant postprocessing analysis of images to improve diagnostic information; and (3) ability to store images electronically and to transfer them within or between health care systems.

ULTRASOUND

Diagnostic ultrasound (US) produces images using echoes or reflection of the US beam from interfaces between tissues with differing acoustic properties. US is nonionizing and safe to perform on pregnant patients and children. It can detect and localize pleural abnormalities and is a quick and effective way of guiding percutaneous needle biopsy of peripheral lung, pleural, or chest wall lesions. US is also helpful in identifying septations within loculated collections and can facilitate placement of a needle for sampling of pleural liquid (i.e., for thoracentesis), improving the yield and safety of the procedure. Bedside availability makes it valuable in the intensive care setting. Real-time imaging can be used to assess the movement of the diaphragm. Because US energy is rapidly dissipated in air, it is not useful for evaluation of