bloody suggests a malignant process; however, other causes of bloody pleural effusions include trauma, tuberculosis, collagen vascular disease, and thromboembolic disease. To confirm the diagnosis of malignancy, cytologic examination of the fluid is needed. Malignant cells can be seen in 60% of malignant effusions on the first thoracentesis. Sensitivity rises to 80% if three separate samples are obtained. If needed, a biopsy of the pleura may be useful in identifying a malignancy. Biopsies may be obtained with video-assisted thoracoscopy or, less optimally, in a blinded fashion through a Cope or Abrams needle.

A low pleural fluid pH has prognostic and therapeutic implications for patients with malignant effusions. Patients with a low pleural fluid pH due to malignancy tend to have shorter survival times and poorer responses to chemical pleurodesis. Recurrent malignant pleural effusions may improve with chemical pleurodesis with talc or tetracycline derivatives, but effectiveness varies, achieving a complete response in little more than 50% of patients. Alternatively, many patients with recurrent malignant effusions have tunneled indwelling pleural catheters placed, allowing intermittent drainage and relief of symptoms.

Systemic inflammatory disorders such as rheumatoid arthritis and lupus erythematosus can be associated with exudative effusions. Rheumatoid pleural effusions are a common intrathoracic manifestation of rheumatoid disease and may be seen in as many as 5% of patients. Rheumatoid factor titers in pleural fluid are often greater than 1 : 320, and the pleural fluid glucose level is less than 60 mg/dL (or the pleural fluid–to-serum glucose ratio is less than 0.5). However, a low glucose level also may be found in complicated parapneumonic effusions or empyema, malignant effusion, tuberculosis pleurisy, lupus pleuritis, and esophageal rupture. In systemic lupus erythematosus, 15% to 50% of patients have pleural effusions, and the pleural fluid antinuclear antibody titer is greater than 1 : 160.

Measuring pleural fluid amylase concentrations may further refine the differential diagnosis for an exudative effusion. Finding a pleural amylase level greater than the upper limit of normal for serum amylase is consistent with acute pancreatitis, chronic pancreatic pleural effusion, esophageal rupture, or malignancy. Pancreatic disease is associated with pancreatic amylase isoenzymes, whereas malignancy and esophageal rupture are characterized by a predominance of salivary isoenzymes.

Pneumothorax

Pneumothorax is the accumulation of air in the pleural space. In this instance, pleural pressure becomes positive, and there is compression of underlying lung. Patients with pneumothorax typically have acute onset of dyspnea. Findings include tachycardia, decreased breath sounds, decreased tactile fremitus, a pleural friction rub, subcutaneous emphysema, hyperresonance, and a tracheal shift to the opposite side.

The diagnosis can be made by obtaining an upright chest radiograph, and rapid assessment can be achieved with point-of-care ultrasound. Typically, the visceral pleura separates from the parietal pleura, and air can be seen between the visceral pleural lining and the rib cage. An end-expiratory radiograph increases the density of lung while reducing its volume, highlighting the difference between the lung parenchyma and the pleural gas.

Management of a significant pneumothorax usually requires insertion of a thoracostomy tube and suction followed by water-seal drainage. However, if the pneumothorax is small and the patient is not in distress, observation alone may be indicated. If there is not a continuing air leak, as from a bronchopleural fistula, the pleural air is reabsorbed into the blood with resolution of the pneumothorax.

A tension pneumothorax is a medical emergency that requires immediate decompression by placement of a chest catheter. A tension pneumothorax occurs when pleural pressure reaches levels sufficient to cause mediastinal shift, compression of the vena cava and heart, and hemodynamic compromise. This physiology implies an ongoing leak of air into the pleural space.

Pneumothorax is often associated with blunt or penetrating trauma. With penetrating trauma, air may leak into the pleural space through the chest wall or the lung. Mechanical ventilation has also been associated with pneumothorax. Patients with underlying lung disease receiving mechanical ventilation may acutely develop a pneumothorax. A sudden rise in peak airway pressures with a reduction in breath sounds can alert the clinician to this complication.

Pneumothorax may occur spontaneously or result from underlying lung disease. Typically, spontaneous pneumothorax occurs in tall, young, thin men, presumably a result of rupture of apical blebs. Underlying lung diseases that can be complicated by pneumothorax include emphysema, cystic fibrosis, granulomatous inflammation, necrotizing pneumonia, pulmonary fibrosis, and lung abscess. Catamenial pneumothorax occurs in women who have subpleural and diaphragmatic endometriosis, with rupture of the endometrial nodules at the time of menstruation causing pneumothorax.

Mesothelioma

Malignant mesotheliomas are neoplasms arising from the serosal membranes of the body cavities. Eighty percent of mesotheliomas originate in the pleura. Individuals usually are older than 55 years, and there is an association with asbestos exposure in the distant past. Symptoms include shortness of breath, chest pain, and weight loss.

The most common radiologic finding is a large, unilateral pleural effusion that may completely opacify the hemithorax. There may be circumferential pleural thickening, usually associated with various amounts of calcified pleural plaque and effusions. CT of the chest is the most accurate noninvasive method for assessing stage and progression of mesothelioma. Pleural fluid cytology frequently is insufficient for diagnosis, and the most efficient way of obtaining tissue is by CT-guided core biopsy or thoracoscopy.

The overall prognosis for patients with malignant mesothelioma is poor. No particular therapy has emerged as superior to supportive therapy alone in terms of survival.

MEDIASTINAL DISEASE

Lesion Location

The mediastinum is the central part of the thoracic cavity between the lungs that contains the heart and aorta, esophagus, trachea, lymph nodes, and thymus. The mediastinum is bordered by the