Thoracentesis

BEFORE THE PROCEDURE
- Verify a signed informed consent for the procedure. This invasive procedure requires informed consent.
- Assess knowledge and understanding of the procedure and its purpose; provide additional information as needed. An informed client will be less apprehensive and more able to cooperate during the thoracentesis.
- Preprocedure fasting or sedation is not required. Only local anesthesia is used in this procedure, and the gag and cough reflexes remain intact.
- Administer a cough suppressant if indicated. Movement and coughing during the procedure may cause inadvertent damage to the lung or pleura.
- Obtain a thoracentesis tray, sterile gloves, injectable lidocaine, povidone-iodine, dressing supplies, and an extra overbed table or Mayo stand. These supplies are used by the physician performing the procedure.
- Position the client upright, leaning forward with arms and head supported on an anchored overbed table. This position spreads the ribs, enlarging the intercostal space for needle insertion.
- Inform the client that although local anesthesia prevents pain during the procedure, a sensation of pressure may be felt. A pressure sensation occurs as the needle punctures the parietal pleura to enter the pleural space.

AFTER THE PROCEDURE
- Monitor pulse, color, oxygen saturation, and other signs during thoracentesis. These are indicators of physiologic tolerance of the procedure.
- Apply a dressing over the puncture site, and position on the unaffected side for 1 hour. This allows the pleural puncture to heal.
- Label obtained specimen with name, date, source, and diagnosis; send specimen to the laboratory for analysis. Fluid obtained during thoracentesis may be examined for abnormal cells, bacteria, and other substances to determine the cause of the pleural effusion.
- During the first several hours after thoracentesis, frequently assess and document vital signs; oxygen saturation; respiratory status, including respiratory excursion, lung sounds, cough, or hemoptysis; and puncture site for bleeding or crepitus. Frequent assessment is important to detect possible complications of thoracentesis, such as pneumothorax.
- Obtain a chest x-ray. Chest x-ray is ordered to detect possible pneumothorax.
- Normal activities generally can be resumed after 1 hour if no evidence of pneumothorax or other complication is present. The puncture wound of thoracentesis heals rapidly.

THE CLIENT WITH PNEUMOTHORAX

Accumulation of air in the pleural space is called pneumothorax. Pneumothorax can occur spontaneously, without apparent cause, as a complication of preexisting lung disease, as a result of blunt or penetrating trauma to the chest, or from an iatrogenic cause (e.g., following thoracentesis).

Pathophysiology

Pressure in the pleural space is normally negative in relation to atmospheric pressure. This negative pressure is vital to the process of breathing. Contraction of the diaphragm and the intercostal muscles enlarges the thoracic space. Negative intrapleural pressure draws the lung outward, increasing its volume so air rushes in to fill the expanded lung space.

When either the visceral or parietal pleura is breached, air enters the pleural space, equalizing this pressure. Lung expansion is impaired, and the natural recoil tendency of the lung causes it to collapse to a greater or lesser extent, depending on the size and rapidity of air accumulation. Table 38–7 illustrates the classifications of pneumothorax.

Spontaneous Pneumothorax

Spontaneous pneumothorax develops when an air-filled bleb, or blister, on the lung surface ruptures. Rupture allows air from the airways to enter the pleural space. Air accumulates until pressures are equalized or until collapse of the involved lung section seals the leak. Spontaneous pneumothorax may be either primary (simple) or secondary (complicated).

Primary pneumothorax affects previously healthy people, usually tall, slender men between ages 16 and 24 (Way & Doherty, 2003). The cause of primary pneumothorax is unknown. Risk factors include smoking and familial factors. Air-filled blebs tend to form in the apices of the lungs. This is considered to be a benign condition, although recurrences are common. Certain activities also increase the risk of spontaneous pneumothorax, such as high-altitude flying and rapid decompression during scuba diving.

Secondary pneumothorax, generally caused by overdistention and rupture of an alveolus, is more serious and potentially life threatening. It develops in clients with underlying lung disease, usually COPD. Middle-age and older adults are primarily affected. Secondary pneumothorax also may be associated with asthma, cystic fibrosis, pulmonary fibrosis, tuberculosis, acute respiratory distress syndrome (ARDS), and other lung diseases. Rarely, a form of secondary pneumothorax called catamenial pneumothorax can develop in affected women within 24 to 48 hours of the onset of menstrual flow.

MANIFESTATIONS The manifestations of spontaneous pneumothorax depend on the size of pneumothorax, extent of lung collapse, and any underlying lung disease. Typically, pleuritic chest pain and shortness of breath begin abruptly, often while at rest. The respiratory and heart rates increase as gas exchange is affected. Chest wall movement may be asymmetrical, with less movement on the affected side than the unaffected side. The affected side is hyperresonant to percussion, and breath sounds may be diminished or absent. Hypoxemia may develop, although normal mechanisms that shunt