about making organisms more multidrug resistant. Oxygen administration is used for children with acute episodes but must be used cautiously because many children with CF have chronic carbon dioxide retention, and the unsupervised use of oxygen can be harmful (see Oxygen Therapy, Chapter 20). With repeated infection and inflammation, bronchial cysts and emphysema may develop. These cysts may rupture, resulting in a pneumothorax.

Nursing Alert

Signs of a pneumothorax are usually nonspecific and include tachypnea, tachycardia, dyspnea, pallor, and cyanosis. A subtle drop in oxygen saturation (SaO_2; measured by pulse oximetry) may be an early sign of pneumothorax.

Blood streaking of the sputum is usually associated with increased pulmonary infection and often requires no specific treatment. Hemoptysis indicates a potentially life-threatening event seen more commonly in older patients with advanced disease, and needs to be treated immediately. Sometimes bleeding can be controlled with bed rest, IV antibiotics, replacement of acute blood loss, IV conjugated estrogens (Premarin) or vasopressin (Pitressin), and correction of any coagulation defects with vitamin K or fresh-frozen plasma. If hemoptysis persists, the site of bleeding should be localized via bronchoscopy and cauterized or embolized. In severe cases, a lung resection may be required.

Nasal polyposis can develop in two thirds of patients with CF and occur due to chronic inflammation. Treatment of nasal polyps includes intranasal corticosteroids, decongestants, and mucolytics. If these measures are ineffective, surgical interventions may be necessary. Saline irrigations are often prescribed to remove thick nasal secretions and to treat chronic sinusitis associated with CF.

Because pulmonary damage in patients with CF is believed to be caused by the inflammatory process that occurs with frequent infections, the use of corticosteroids has been studied; however, treatment with corticosteroids for prolonged periods found only a modest efficacy and numerous side effects including linear growth restriction, glucose tolerance abnormalities, and cataract formation. Antiinflammatory medications such as ibuprofen are becoming