



environmental exposure suggests diseases such as asthma and hypersensitivity pneumonitis. Positional dyspnea can occur in patients with severe obstructive lung disease, diaphragmatic paralysis, or neuromuscular weakness.

Orthopnea is dyspnea that occurs in the supine position. This condition may result from a decrease in vital capacity caused by abdominal contents exerting force against the diaphragm. Paroxysmal nocturnal dyspnea is dyspnea that occurs 1 to several hours after lying down and is associated with congestive heart failure. Increased venous return to the heart causes this condition, resulting in mild interstitial pulmonary edema. Asthma can also be associated with nocturnal dyspnea and is thought to result from decreased vital capacity in the supine position, decreased production of endogenous agents with bronchodilator functions, and increased exposure to allergens in bedding. Exercise-induced asthma causes dyspnea out of proportion to the degree of exertion, with dyspnea often being most severe in the 15 to 30 minutes after the cessation of exercise.

Wheezing has many causes, including asthma. However, the absence of wheezing does not rule out asthma in any setting, and the presence of wheezing does not establish the diagnosis. Other conditions that cause wheezing are congestive heart failure; endobronchial obstruction by tumor, foreign body, or mucus; vocal cord abnormalities; and acute bronchitis.

Cough is a frustrating symptom for the patient and the physician. The three most common causes of chronic cough are post-nasal drip, asthma, and gastroesophageal reflux disease. Cough may be mild and infrequent, or it may be severe enough to induce emesis or syncope. Cough may be dry or may produce sputum or blood (i.e., hemoptysis). The symptom may begin months after initiation of a drug (e.g., angiotensin-converting enzyme [ACE] inhibitors), leading to a dry, hacking cough. *Bordetella pertussis* infection (i.e., whooping cough) and viral lower respiratory tract infections can produce a cough that may last for 3 months or longer. Patients with asthma often have a cough. Occasionally, cough is their only symptom, a condition referred to as *cough-variant asthma*. Nocturnal cough suggests asthma, heart failure, or gastroesophageal reflux disease.

More than occasional production of sputum is abnormal and should be characterized with regard to quantity, color, timing, and presence or absence of blood. The physician should ask the patient to estimate the frequency and volume of sputum produced in 24 hours and describe diurnal variations. Chronic bronchitis is defined as a persistent cough resulting in sputum production for more than 3 months in each of the past 3 years. Patients with asthma often have a productive cough resulting from excess mucus production. Colored sputum does not always signify a bacterial infection because the concentration of cellular debris—predominantly white cells in inflammatory processes— influences sputum color. Patients with difficult to control asthma who report brown plugs or casts of the small bronchi in their sputum may have allergic bronchopulmonary aspergillosis.

Hemoptysis is a frightening symptom. The volume of blood may be scant or large enough to cause asphyxiation or exsanguination. The most common cause of hemoptysis in the United States is bronchitis, whereas the most common cause worldwide is pulmonary tuberculosis. Most cases of hemoptysis are small in volume and self-limited, and they resolve with the treatment of

the underlying process. Massive hemoptysis, defined as more than 500 mL of blood in 24 hours, is rare and considered a medical emergency when it occurs. Causes of massive hemoptysis include lung cancer, lung cavities containing mycetomas, cavitary tuberculosis, pulmonary hemorrhage syndromes, pulmonary arteriovenous malformations, and bronchiectasis. The physician should distinguish among hemoptysis, epistaxis, and hemateme-sis. Because many patients have trouble identifying the source of the bleeding, a careful upper airway physical examination is essential.

Chest pain attributable to the lungs usually results from pleural disease, pulmonary vascular disease, or musculoskeletal pain precipitated by coughing because no pain receptors exist in the lung parenchyma. Lung cancer, for example, does not cause pain until it invades the pleura, chest wall, vertebral bodies, or mediastinal structures. Disease or inflammation of the pleura causes pleuritic chest pain characterized as a sharp or stabbing pain with deep inspiration. Pain caused by pulmonary emboli, infection, pneumothorax, and collagen vascular disease is usually pleuritic. Pulmonary hypertension may produce dull anterior chest pain unrelated to respiration caused by right ventricular strain and demand ischemia. Other examples of noncardiac causes of chest pain are esophageal disease, herpetic neuralgia, musculoskeletal pain, and trauma. Older patients or those with a history of chronic systemic steroid use may have thoracic pain resulting from vertebral compression or rib fractures.

Adequate analgesia, including narcotics, is essential in the treatment of chest pain in patients with underlying lung disease to prevent the reduction in vital capacity caused by splinting of the chest in reaction to the pain. The diagnosis of musculoskeletal chest pain should be considered after other causes have been ruled out. This pain is usually reproducible with movement or palpation over the affected area.

HISTORY

The examiner should always ask about previous respiratory illness, including pneumonia, tuberculosis, or chronic bronchitis, and abnormalities seen on the chest radiograph that have been previously reported to the patient. Patients with the acquired immunodeficiency syndrome (AIDS) are at high risk for *Pneumocystis jiroveci* pneumonia and other chest infections, including tuberculosis. Immunosuppression from long-standing steroid use may predispose to tuberculosis and other lung infections.

Most classes of drug can be associated with lung toxicity. Examples include pulmonary embolism from use of the oral contraceptive pill, interstitial lung disease from cytotoxic agents (e.g., methotrexate, cyclophosphamide, bleomycin), bronchospasm from β -adrenergic receptor blockers or nonsteroidal anti-inflammatory drugs, and cough from ACE inhibitors. Some drugs known to cause lung disease may not be mentioned by the patient because they are illegal (e.g., cocaine, heroin).

An accurate history of tobacco use and other toxic and environmental exposures is essential for patients with respiratory complaints. Tobacco smoke is the most prevalent environmental toxin causing lung disease. Asking about tobacco use and attempting to motivate patients to quit smoking are the physician's duty. The risk for lung disease from smoking is directly related to individual genetic susceptibility and the total