Basic Athletic Training
Course Pack D

CHAPTER

26

Respiratory Tract Conditions

STUDENT OUTCOMES

1. Explain the physiological factors associated with common respiratory tract conditions.
2. Identify the signs and symptoms of common upper respiratory tract conditions, including the common cold, sinusitis, pharyngitis, laryngitis, tonsillitis, and allergic rhinitis.
3. Describe the strategies that can be used to prevent the common cold.
4. Identify the signs and symptoms of general respiratory conditions, including bronchitis, bronchial asthma, exercise-induced bronchospasm, influenza, and

pneumonia.

5. Describe the management of common respiratory tract conditions.
6. Explain the use of metered-dose inhalers and peak flow meter in the management of asthma.

INTRODUCTION

Healthy lungs consist of an elastic network of air passageways and spaces that are bound together by connective tissue. Although the lungs occupy the majority of the thoracic cavity, each lung weighs only approximately 0.6 kg (1.25 lb). The left lung is smaller than the right lung, because it contains a concavity known as the cardiac notch, in which the heart is nestled. The lungs extend distally to the level of, or slightly below, the 12th rib in 80% of people and to the L1 spinal level in approximately 18% of individuals. The primary bronchial tubes branch obliquely downward from the trachea and then branch into approximately 23 levels until the terminal bronchioles are reached (**Fig. 26.1**). These tiny air sacs, called alveoli, serve as diffusion chambers where oxygen from the lungs enters adjacent capillaries and carbon dioxide from the blood is returned to the lungs.

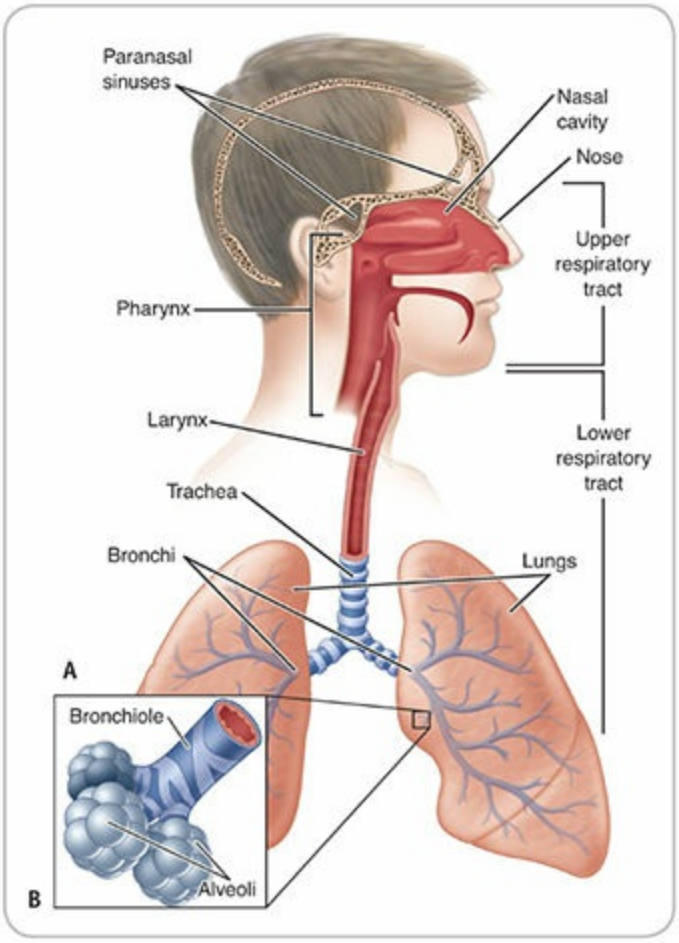

Figure 26.1. Respiratory system. A, The trachea, bronchi, and lungs. **B,** The terminal ends of the bronchial tree are alveolar sacs, where oxygen and carbon dioxide are exchanged.

Conditions of the respiratory tract are common. Resistance to these conditions can be suppressed by a variety of factors, including fatigue, chronic inflammation from a localized infection, environment (e.g., allergens, dust, and smog), and psychological stress. In this chapter, common upper respiratory tract infections and general respiratory conditions are discussed.

UPPER RESPIRATORY TRACT INFECTIONS

? A swimmer appears to have a common cold. What additional signs and symptoms would suggest that the swimmer has sinusitis?

Viral conditions are often referred to as upper respiratory infections (URIs). These conditions, although minor, can clearly impact one's performance, especially if a fever is present. In general, individuals should not participate in physical activity if they have a fever (≥100.5°F/38.0°C), severe malaise, **myalgia**, weakness, shortness of breath, and/or severe cough or if they are dehydrated.[1,2] Fever decreases strength, aerobic power, endurance, coordination, and concentration, and it can lead to injury or heat illness. Dehydration magnifies the effects of fever and also can lead to heat illness. In this section, the common cold, sinusitis, pharyngitis, laryngitis, tonsillitis, and allergic rhinitis (i.e., hay fever) are discussed.

Common Cold

Etiology

The average adult has from one to six colds each year, with human rhinoviruses accounting from 40% to 50% of these infections. The coronavirus, respiratory syncytial virus, parainfluenza virus, and adenovirus also cause colds. These RNA viruses cause URI when they spread in oral or nasal secretions. The viruses stay in the cooler upper airways because they prefer temperatures below 98.6°F/37.0°C.[2,3] The majority of colds occur during the fall and spring months. The condition may be triggered by aspirin sensitivity, use of oral contraceptives, topical decongestant abuse, cocaine abuse, presence of nasal polyps or a deviated septum, or allergic conditions. A cold can be quite contagious and can be transmitted either by person-to-person contact or by airborne droplets; however, several strategies can be implemented to reduce the risk of getting a cold (**Box 26.1**).

Box 26.1 Strategies to Reduce the Risk of Getting a Cold

- Avoid contact with individuals who have URIs, particularly children, who tend to have more frequent URIs.
- In the presence of individuals who have URIs, avoid touching objects or sharing objects that they have touched.
- Wash the hands frequently during cold season and avoid touching the

eyes and nose with the fingers. This will prevent many viruses from reaching the mucous membranes.

- Drink plenty of clear, nonalcoholic fluids.
- Although vitamin C supplements will not decrease the incidence of colds, they will decrease the duration and severity of symptoms.
- Reduce environmental factors (e.g., dust, smog, allergens) that may be a predisposing factor for rhinitis.
- Reduce stress.
- If using a topical decongestant, follow the instructions carefully. Do not prolong its use because rebound rhinitis may occur. Use decongestants during the day and, because of their sedative effect, antihistamines at night.
- If cold symptoms are mild, exercise is safe. If, however, symptoms include headache, fever, muscle aches, hacking productive cough, or loss of appetite, then exercise should cease. Rest is best.

Upper respiratory symptoms usually begin 1 to 2 days after exposure and generally last for 7 to 10 days. Viral shedding and contagion, however, can continue for another 2 or 3 weeks. Although many individuals feel that performance in sport and physical activity is hindered by a cold, the majority of clinicians suggest resuming regular training a few days after the symptoms' cessation.[2,4]

Signs and Symptoms

Symptoms include a rapid onset of **rhinorrhea**, nasal itching, sneezing, nonproductive cough, and associated itching and puffiness of the eyes. **Malaise**, a mild sore throat, chills, and in some cases, low-grade fever also may be present. Although most cold symptoms are benign and confined to the upper respiratory tract, colds can lead to middle ear infections and bacterial sinusitis when airflow is obstructed by swollen nasal membranes.

Management

Although no cure for the viral common cold is known, over-the-counter (OTC) medications can alleviate or lessen the symptoms. These may include antihistamines, antitussives, expectorants, decongestants, and antipyretics. Treatment is mainly supportive and symptomatic. OTC medications are not recommended for use in children.[5,6] Zinc has been shown in clinical studies involving children to perform well in reducing the number of colds.[6] Caution should be observed when any medications are used by competitive athletes because an agent may be on the list of banned substances, particularly at high competitive levels.

Sinusitis

Etiology

Sinusitis is an inflammation of the paranasal sinus caused by a bacterial or viral infection, allergy, or environmental factors (**Fig. 26.2**). Sinusitis can be acute, lasting for less than 30 days; subacute, lasting for 3 weeks to 2 months; or chronic, lasting for longer than 2 months. The condition often is triggered by an obstruction of the passageway between the sinuses (i.e., ostium) because of local mucosal swelling and insult or by mechanical obstruction. Local mucosal swelling may be secondary to an upper respiratory tract infection, allergy, or direct trauma. Mechanical obstruction may be caused by a deviated septum; concha bullosa, which is the vesicle of serum or blood located on the concha inside the nose; or nasal masses from polyps or tumors.

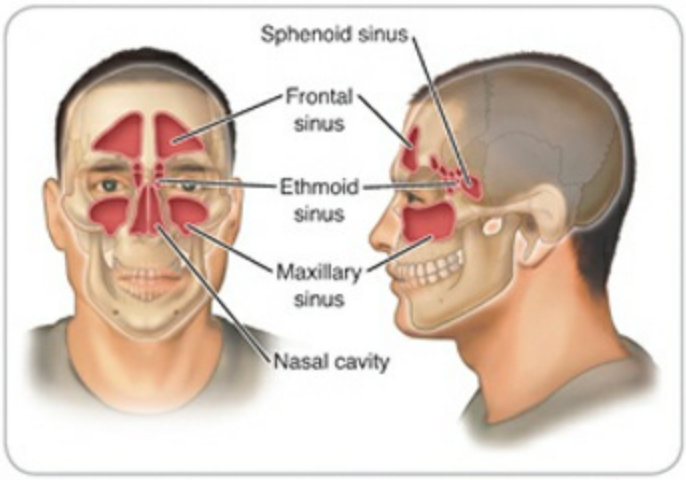

Figure 26.2. Facial sinuses. The frontal and ethmoid sinuses are more commonly involved in sinusitis.

Signs and Symptoms

A sinus infection should be suspected when cold symptoms last for longer than 7 to 10 days or if cold symptoms start to improve but then become worse once again. Nasal congestion, facial pain or pressure over the involved sinus, pain in the upper teeth, or pain and pressure behind the eyes (i.e., retro-orbital) are present. Other symptoms may include purulent nasal discharge, palpable pain over the involved sinus, night- and daytime coughing, and in severe cases, perinasal and eyelid swelling, fever, and chills. Drainage with bacterial infections most likely is dark in color, whereas drainage from other causes usually is clear. Chronic sinusitis is characterized by chronic nasal congestion, rhinorrhea or postnasal discharge accompanied by perinasal pressure, and headache not associated with migraine or muscle tension. The individual often pinches the bridge of the nose to demonstrate the area of discomfort or reports discomfort that is aggravated by eyeglasses.

Management

Treatment involves controlling the infection, reducing mucosal edema, and allowing nasal discharge. Oral antibiotics, such as amoxicillin, penicillin, or erythromycin, may be prescribed; however, some patients may not see significant benefits with antibiotics.[7] Topical agents, such as phenylephrine hydrochloride (e.g., Neo-Synephrine) or oxymetazoline hydrochloride (e.g.,

Afrin), can be used during the first 3 to 4 days of treatment to facilitate drainage. Longer use of decongestants, however, can lead to a rebound effect, whereby production of mucus and edema is increased. In severe cases, surgical intervention may be necessary to drain the sinuses.

Pharyngitis (Sore Throat)

Etiology

Pharyngitis may be caused by a viral, bacterial, or fungal infection of the pharynx, leading to a sore throat. The condition may result from a common cold, influenza, streptococcal infection, diphtheria, herpes simplex virus types 1 and 2, Epstein-Barr virus, gonococcal bacteria, chlamydia, or candidiasis. If caused by the bacteria *Streptococcus pyogenes* (i.e., strep throat) and inadequately treated, peritonsillar abscess, scarlet fever, rheumatic fever, or rheumatic heart disease may result. Peak seasons for pharyngitis include the late winter and early spring.[7,8]

Signs and Symptoms

The throat typically appears to be dark red and the tonsils red and swollen, and a pus discharge may be present. Throat pain is aggravated by swallowing and may radiate along the distribution of the glossopharyngeal nerve (i.e., cranial nerve IX) to the ears. Other symptoms include rhinorrhea, swollen lymph glands, hoarseness, headache, cough, conjunctivitis, low-grade fever, and malaise. Individuals with bacterial pharyngitis generally do not have rhinorrhea, cough, or conjunctivitis.[7,8]

Management

Treatment for streptococcal pharyngitis includes antibiotics, such as penicillin or erythromycin. Other antibiotics that may be used are amoxicillin, cephalosporins, macrolides, or clindamycin.[7] The Infectious Diseases Society of America (IDSA) adopted strict guidelines for the treatment of acute pharyngitis, which include laboratory confirmation of *Streptococcus* infection with either a rapid antigen detection test (RADT) or throat culture before

antibiotics are prescribed.[9] In cases that do not involve streptococcal pharyngitis, treatment involves bed rest, drinking fluids, warm saline gargles, throat lozenges, and mild analgesics (e.g., aspirin or ibuprofen).[7]

Laryngitis

Etiology

In **laryngitis**, tissues inferior to the epiglottis are swollen and inflamed, leading to swelling around the vocal cords so that they cannot vibrate normally, resulting in a characteristic hoarseness of the voice. Laryngitis is common and often occurs during a URI (e.g., cold). The condition also can be caused by direct trauma to the throat, gastroesophageal reflux disease (GERD), allergies, or cigarette smoke or from general irritation of straining the vocal cords, as may occur in singers, politicians, cheerleaders, or other individuals who shout excessively while playing or working.

Signs and Symptoms

Laryngitis is characterized by a weak, hoarse, gravelly voice; sore throat; fever; cough (usually dry and nonproductive); a tickling in the back of the throat; and difficulty swallowing. Children's croup, or acute epiglottis, can, however, present like laryngitis. Similar to a cough, laryngitis may persist after the acute infection is over. This can be recognized by noting that the fever and ill feeling subside but the hoarseness continues for another several days to a week or longer.

Management

Laryngitis is self-limiting under most conditions. The patient should attempt to rest the voice. Drinking warm liquids; sucking on a cough drop, throat lozenge, or hard candy; or gargling with a warm salt solution (half a teaspoon of salt in 1 cup of water) may relieve some of the symptoms. One should avoid smoking or places where cigarettes are smoked. Use of a humidifier, preferably a cool mist ultrasonic humidifier, may ease symptoms. This type of humidifier is more expensive than the usual vaporizer, but it is also safer and more effective.

Standing for extended periods in a hot, steamy shower also may be helpful. Aspirin, ibuprofen, or acetaminophen may be used to reduce the fever, muscle discomfort, and pain. Aspirin, however, should not be used in someone younger than 19 years, because it can trigger an attack of Reye syndrome.

The patient should be seen by a physician if any of the following conditions are present, because these symptoms may indicate a more serious underlying problem:

- Difficulty breathing or swallowing
- Fever of greater than 101.0°F/38.3°C
- In a young child, a deep cough like the bark of a seal
- Presence of brown, green, or yellow sputum
- Hoarseness that lasts for 1 month without any identifiable cause

Tonsillitis

Etiology

The tonsils are lymph glands or nodes located at the back of the throat that help to protect the pharynx by filtering disease-producing bacteria before they enter the breathing passage. During the filtering process, the tonsils themselves may become inflamed and acutely or chronically infected. This condition, called **tonsillitis**, is most often caused by a bacterial streptococcal infection but may result from viral infections, such as the flu, common cold, mononucleosis, or herpes simplex. All forms of tonsillitis are contagious and generally spread from person to person in coughs, sneezes, and nasal fluids.

Signs and Symptoms

Tonsillitis is characterized by inflamed and enlarged tonsils, fever, painful swallowing, sore throat, and a slight change in voice. Tissues surrounding the tonsils frequently form pus during acute attacks of tonsillitis, particularly streptococcal tonsillitis, causing the tonsils to show white specks or become coated with whitish exudate. Other symptoms include swollen lymph nodes,

headache, and bad breath. Nausea, vomiting, and abdominal pain may occur in younger children. Pharyngitis often occurs along with tonsillitis.

Management

Acute cases of bacterial tonsillitis can be treated with antibiotics, such as penicillin, but viral tonsillitis cannot. Chronic recurrent tonsillitis may be treated by surgical removal of the tonsils, a procedure known as a tonsillectomy.

Allergic Rhinitis (Hay Fever)

Etiology

Allergic rhinitis (AR) is an inflammation of the nasal mucous membranes that affects 10% to 20% of children and adults in the United States and often coexists with asthma.[7,10] The risk of rhinitis increases throughout childhood and adolescence and then peaks during the late 20s and early 30s. Rhinitis may be classified into nonallergic and allergic; AR is further divided into seasonal (hay fever) and perennial (all-year-round). Hay fever usually involves a specific period of symptoms during successive years caused by airborne pollens or fungal spores associated with that season. In contrast, perennial AR occurs year-round if the patient is continually exposed to allergens such as food (e.g., shellfish or bread mold), dust, and animal emanations (e.g., hair or feathers).

Signs and Symptoms

Postnasal drainage leads to a chronic sore throat and bronchial infection. In addition, the pharyngeal openings of the eustachian tubes can become blocked by swollen mucosa, enlarged lymphoid tissue, or exudate. Without normal airflow, increasing negative pressure in the middle ear results in fluid accumulation, leading to partial hearing loss and recurrent middle ear infections.

Taking a complete history is the key to differentiate AR from other respiratory conditions. Questions should focus on the relationship of symptoms

to seasons or exposures that trigger symptoms. For example, if symptoms increase while the individual is outdoors, pollen may be the triggering agent; if symptoms increase while the individual is indoors, mold could be the culprit. In addition, certain geographic areas may have more environmental allergens than others. Individuals should try to limit their exposure to allergens when participating in different environments. Allergy tests (i.e., skin or intradermal testing) may not be necessary if a history uncovers allergens to specific environmental factors.

Management

Management involves limiting exposure to the allergen or irritant, suppressive medication to alleviate symptom severity, and specific hypersensitization to reduce responsiveness to unavoidable allergens. For example, if dust is an allergen, then having bare floors, having pillows and mattresses encased in plastic covers, minimizing cloth curtains, and avoiding cluttered tabletops can reduce the amount of dust in a home. Oral and topical antihistamines are effective in reducing histamine-related symptoms such as itching, rhinorrhea, and sneezing; however, drowsiness, lethargy, mucous membrane dryness, and occasional nausea and light-headedness may be unwanted side effects.[7,11] Intranasal steroids used to relieve nasal obstruction are the treatment of choice for persistent moderate to severe AR and may also improve nonallergic rhinitis.[7,11] Caution should be observed when any of the preceding medications are used by competitive athletes, however, because an agent may be on the list of banned substances, particularly at high competitive levels.

In addition to the signs and symptoms associated with the common cold, sinusitis would be suggested if the swimmer exhibits nasal congestion, facial pain over the sinus region, pain behind the eyes, and coughing.

GENERAL RESPIRATORY CONDITIONS

? A softball player has exercise-induced bronchospasm. What conditions might contribute to the severity of this respiratory problem?

General respiratory conditions may result from infection or irritation from inhaled particles and substances. Bronchitis, bronchial asthma, exercise-induced bronchospasm (EIB; formerly called exercise-induced asthma), influenza, and pneumonia are discussed.

Bronchitis

Etiology

Bronchitis is the inflammation of the mucosal lining of the tracheobronchial tree. The condition results from infection or inhaled particles and substances and may be acute or chronic (chronic obstructive pulmonary disease). The most common causes stem from viruses (e.g., parainfluenza, respiratory syncytial, adenoviruses, rhinoviruses, influenza viruses, or enteroviruses) and bacteria (e.g., *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, or *Bordetella pertussis*).[1]

Signs and Symptoms

Acute bronchitis, which is commonly seen in physically active individuals, involves bronchial swelling, mucus secretion, and increased resistance to expiration. Coughing, wheezing, and large amounts of purulent mucus are present. Once the stimulus is removed, however, the swelling decreases and the airways return to normal.

Chronic bronchitis is characterized by a productive daily cough for at least 3 consecutive months in 2 successive years. Irritation may result from cigarette smoke, air pollution, or infections. This condition can progress to increased airway obstruction, heart failure, and cellular changes in respiratory epithelial cells that may become malignant. Signs and symptoms include marked cyanosis, edema, large production of sputum, and abnormally high levels of carbon dioxide as well as low levels of oxygen in the blood. This condition is often seen simultaneously with emphysema.

Management

No specific therapy is available for most types of viral bronchitis. Most cases, however, subside after a few days or a week. Limited prescribed medication is available if the cause stems from influenza viruses. Bacteria-related bronchitis is treated more effectively with macrolides. Fever associated with the conditions may be managed with acetaminophen or ibuprofen. Aspirin, however, should not be used for individuals younger than 19 years, because it increases the incidence of Reye syndrome.[1]

Bronchial Asthma

Etiology

Asthma is caused by a constriction of bronchial smooth muscles (bronchospasm), increased bronchial secretions, and mucosal swelling, all leading to an inadequate airflow during respiration (especially expiration) (**Fig. 26.3**). The condition is classified as intermittent, seasonal, or chronic. Intermittent asthma usually is of relatively short duration, occurring less than 5 days per month with extended, symptom-free periods. Symptoms of seasonal asthma occur for prolonged periods as a result of exposure to seasonal inhalant allergens. Chronic asthma occurs daily or near daily, with an absence of extended, symptom-free periods.

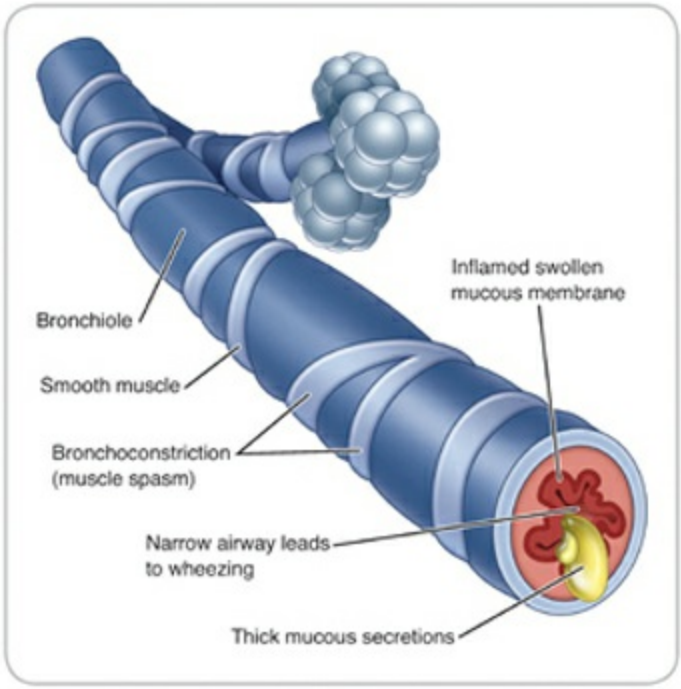

Figure 26.3. Bronchospasm. An asthma attack is caused by bronchospasm that constricts the bronchiolar tubes. This spasm, combined with increased bronchial secretions and mucosal swelling, results in a characteristic, loud wheezing sound that is heard during expiration.

Signs and Symptoms

Patients with asthma experience episodic, paroxysmal attacks of shortness of breath and wheezing, which result from air squeezing past the narrowed airways. Because the airways cannot fill or empty adequately, the diaphragm tends to flatten, and the accessory muscles must work harder to enlarge the chest during inspiration. This increased workload leads to a rapid onset of fatigue when the patient can no longer hyperventilate enough to meet the increased oxygen need. Acute attacks may occur spontaneously, but they are often provoked by a viral infection.

A large amount of thick, yellow, or green sputum is produced by the bronchial mucosa. As dyspnea continues, anxiety, loud wheezing, sweating, rapid heart rate, and labored breathing develop. In severe cases, respiratory failure may be indicated by cyanosis, decreased wheezing, and decreased levels of consciousness.

Management

Current guidelines for asthma management concur that inhaled corticosteroids (ICS) are the mainstays of anti-inflammatory therapy in asthma. However, asthma is often inadequately controlled, even with high doses of ICS, warranting additional therapies. Accordingly, long-lasting β_2-agonists (LABAs) delivered by a compressor-driven nebulizer or inhaler are used in combination with ICS. However, short-term treatment includes using short-acting β_2-agonists to give quick relief to symptoms.[7,12] The value of bronchodilators in children and young adults, however, continues to be debated. Once the attack has subsided, the lungs usually return to normal.

Exercise-Induced Bronchospasm

Etiology

EIB has been observed in 35% to 78% of patients with asthma, most commonly in the form of a reaction 3 to 12 minutes after exercise is completed.[11] Factors contributing to the severity of EIB include ambient air conditions (e.g., cold air, low humidity, and pollutants); duration, type, and intensity of exercise; exposure to allergens in sensitized individuals; overall control of asthma; poor physical conditioning; respiratory infections; time since the last episode of EIB; and any underlying bronchial hyperreactivity. Individuals suffering from allergies, sinus disease, or hyperventilation may be at increased risk for EIB, and symptoms can be exacerbated for those with bronchitis, emphysema, and other diseases affecting the bronchial tubes.

Despite the prevalence of EIB, the mechanism of bronchospasm remains unclear. One theory emphasizes the significance of a rise in osmolarity in the respiratory tract, resulting in the release of mediators during exercise, whereas the other main theory stresses the activity of the vascular system resulting in air passage narrowing.[7,13] Regardless of the mechanism, the amount of ventilation and the temperature of the inspired air both during and after exercise are important factors in determining the severity of EIB. The greater the ventilations (i.e., volume of air inspired) in cold, dry air, the greater the risk of EIB, and the more strenuous the exercise, the greater the ventilations.

Recently, EIB has been diagnosed according to forced expiratory volume at 1 second (FEV_1) using a peak flow meter. Normally, individuals can have up to a 10% decrease in FEV_1 postexercise. When FEV_1 drops by 15%, however, the individual is considered to have mild EIB. A drop of 20% to 40% indicates moderate to severe EIB, and a drop of more than 40% indicates severe EIB. Several questions can be asked during the history to help screen for EIB (Box 26.2).

BOX 26.2 History Questions to Screen for Exercise-Induced Bronchospasm

- Have you ever been told that you have asthma or EIB?
- Do you ever have chest pain or tightness during or following exercise?
- Do you ever wheeze during or after moderate exercise?
- Do you ever have shortness of breath during or after exercise?
- Do you ever have itching of the nose or throat or sneezing episodes during or after exercise?
- Have you ever experienced stomach cramps after exercise?
- Have you ever missed work or school because of chest pain, chest tightness, coughing, wheezing, or prolonged shortness of breath?

See **Application Strategy: Use of a Peak Flow Meter**, available on the companion Web site at thePoint.

Signs and Symptoms

EIB occurs in three distinct phases. In the first phase, symptoms peak 5 to 10 minutes after exercise begins, lasting for 30 to 60 minutes. Common signs and symptoms include chest pain, chest tightness, or a burning sensation with or without wheezing; a regular, dry cough; shortness of breath shortly after or during exercise; and stomach cramps after exercise. Approximately 50% of individuals with EIB experience the second phase, a "refractory" period. This phase starts 30 minutes to 4 hours after exercise begins and is associated with

limited to no bronchospasm. During this period, it may be possible to exercise longer and more strenuously without difficulty. The final phase involves symptoms similar to those experienced during the first phase, but these symptoms are less severe. Symptoms recur 12 to 16 hours after exercise is completed and usually remit within 24 hours.[14]

Management

Pharmacological therapy includes inhaled β-agonists, steroids, cromolyn, nedocromil, ipratropium or tiotropium, and oral leukotriene antagonists. Competitive athletes, however, should consult with appropriate governing sport bodies to ensure the medication is legal for competition. Nonpharmacological therapy includes high intensity warm-up exercise to help reduce EIB, but it is not as effective as albuterol or other medications. There are also some data indicating that a low-salt diet or fish oil supplementation to the diet will reduce EIB and the inflammation associated with the condition.[15]

See **Application Strategy: Use of a Metered-Dose Inhaler**, available on the companion Web site at thePoint.

Application Strategy 26.1 presents a management algorithm for individuals with EIB.

APPLICATION STRATEGY 26.1

Management Algorithm for Exercise-Induced Bronchospasm

General Recommendations

- Consult a physician before beginning an exercise program.
- Take medication for asthma as prescribed to achieve overall control of asthmatic symptoms, including those caused by exercise and airborne allergens.
- Use a peak flow meter as directed by a physician.
- Avoid exposure to air pollutants and allergens whenever possible.

- Avoid exercise during the early morning hours, when the concentration of ragweed is highest.

Exercise Routine

- Use a bronchodilator before exercise.
- Perform a 5- to 10-minute warm-up period of moderate stretching and work out slowly for another 10–15 minutes, keeping the pulse rate below 60% of maximum heart rate.
- Increase the time and intensity of the workout as tolerated, especially if the activity is new.
- Breathing
  - Breathe slowly through the nose to warm and humidify the air. Exercise in a warm, humid environment, such as a heated swimming pool.
  - In cold, dry environments, breathe through a mask or a scarf. Alternatively, consider different locations and types of exercise during winter months, such as swimming, running, or cycling indoors.
- Perform a gradual 10- to 30-minute cooldown period after a vigorous workout.
  - This avoids rapid thermal changes in the airways.
  - This can be achieved by slowing to a less intense pace while jogging, cycling, swimming, and stretching.

Influenza

Etiology

Influenza, or "the flu," is a specific viral bronchitis caused by *Haemophilus influenza* type A, B, or C. It often occurs in epidemic proportions, particularly among school-aged children. Immunization for the type A and B viruses is available for individuals who are at high risk, including pregnant women; individuals with chronic illness, such as diabetes mellitus and disorders of the pulmonary or cardiovascular system; children; and those with

immunocompromised systems. Individuals with a fever should not be immunized until the fever has passed.

Signs and Symptoms

A fever of 39.0° to 39.5°C (102° to 103°F), chills, malaise, headache, general muscle aches, hacking cough, and inflamed mucous membranes may be present. Rapid onset of symptoms can occur within 24 to 48 hours after exposure to the virus. Sore throat, watery eyes, photophobia, and a nonproductive cough may linger for up to 5 days. In some cases, the cough may progress to bronchitis.

Management

Initial treatment consists of rest, plenty of fluids, salt water gargles, cough medication, and analgesics to control fever, aches, and pains. If the temperature does not return to near normal within 24 hours, the patient should be seen immediately by a physician to rule out other infectious conditions.

Pneumonia

Etiology

Pneumonia is an inflammation and infection of the lungs that may be caused by bacteria, viruses, mycoplasmas, or other infectious agents, such as fungi, including *Pneumocystis* sp., and by various chemicals. Individuals at an increased risk of pneumonia include those age 65 years or older; very young children, whose immune systems are not fully developed; those with an immunodeficiency disease (e.g., AIDS) or a chronic illness (e.g., cardiovascular disease, emphysema, or diabetes); individuals who have had their spleen removed; and individuals whose immune system has been impaired by chemotherapy or long-term use of immunosuppressant drugs. Smoking and abusing alcohol or drugs can also place one at higher risk. Smoking damages the airways, and alcohol interferes with the action of the white blood cells that fight infection. Use of intravenous drugs can lead to injection site infections that can travel through the bloodstream to the lungs. In addition, exposure to air pollutants or toxic fumes from certain agricultural,

construction, and industrial chemicals may contribute to some types of pneumonia.

Pneumonia bacteria are present in some healthy throats. When body defenses are weakened in some way, such as by illness, old age, malnutrition, general debility, or impaired immunity, the bacteria can multiply and cause serious damage. Usually, when a person's resistance is lowered, bacteria work their way into the lungs and inflame the alveoli. The alveoli then fill with pus and other liquids, preventing oxygen from transferring into the bloodstream. The tissue from either part of a lobe of the lung, an entire lobe, or most of the lung's five lobes becomes completely filled with liquid. The infection quickly spreads through the bloodstream, and the whole body is invaded. In some cases, this may lead to death. *Streptococcus pneumoniae* is the most common cause of bacterial pneumonia, and it is one form of pneumonia for which a vaccine is available. Pneumonia can affect one or both lungs. Infection of both lungs is popularly referred to as double pneumonia.

Signs and Symptoms

The signs and symptoms of pneumonia vary greatly, depending on the type of organism causing the infection and any underlying conditions that may be present. Bacterial pneumonia often follows a URI, such as a cold or flu. Signs and symptoms are likely to present suddenly and include shaking, chills, high fever, sweating, chest pain (pleurisy), and a cough that produces thick phlegm that is rust, green, or yellow in color. Symptoms may be fewer or milder in older adults or in those with a chronic illness.[1,7]

Viral pneumonia, which is caused by some of the same viruses that cause influenza, strikes primarily during the fall and winter and tends to be more serious in people with cardiovascular or lung disease. It usually starts with a dry and nonproductive cough, headache, fever, muscle pain, and fatigue. As the condition progresses, the patient may become breathless, develop a cough that produces phlegm, and run the risk of developing a secondary bacterial pneumonia as well.

Mycoplasmas are tiny organisms that cause symptoms similar to those of both bacterial and viral pneumonia, although these symptoms appear more

gradually and often are milder. Mycoplasmas often cause the type of pneumonia seen in individuals with walking pneumonia. The patient is not sick enough to stay in bed and, therefore, may not seek medical care. This type of pneumonia spreads easily in situations where people congregate and is common in child care centers and among school children and young adults.

Certain types of fungus also can cause pneumonia, especially *Histoplasma capsulatum*, which is common in the Mississippi and Ohio River valleys. Some people experience no symptoms after inhaling this fungus. Others develop symptoms of acute pneumonia, and still others may develop a chronic pneumonia that persists for months.

Pneumonia caused by a parasite, *Pneumocystis carinii*, commonly affects Americans with AIDS. The signs and symptoms of *P. carinii* pneumonia include an ongoing cough, fever, and trouble breathing.

Management

Treatment for pneumonia varies, depending on the type of pneumonia and on the severity of symptoms. Bacterial pneumonia is usually treated with antibiotics; however, antibiotics are not effective against viral forms of pneumonia. Although viral pneumonia may be treated with antiviral medications, the recommended treatment is the same as that for the flu (i.e., rest and plenty of fluids). Mycoplasmal pneumonias are treated with antibiotics. Regardless, it may take 4 to 6 weeks to recover completely if the pneumonia is serious. In some cases, fatigue may continue long after the infection itself has cleared. In addition to these treatments, the physician may recommend OTC medications to reduce fever, treat aches and pains, and soothe the cough associated with pneumonia. The aim is not to suppress the cough completely, however, because coughing helps to clear the lungs.

Conditions that could contribute to the severity of EIB include ambient air conditions, exposure to allergens, poor physical conditioning, respiratory infections, and amount of time since the last episode of EIB.

SUMMARY

1. Viral conditions are often referred to as URIs.
2. The common cold is an acute viral infection that may be triggered by aspirin sensitivity, use of oral contraceptives, abuse of topical decongestants, abuse of cocaine, presence of nasal polyps or a deviated septum, and allergic conditions.
3. Sinusitis is an inflammation of the paranasal sinus caused by a bacterial or viral infection, an allergy, or environmental factors.
4. If pharyngitis is caused by the bacteria *S. pyogenes* and is inadequately treated, peritonsillar abscess, scarlet fever, rheumatic fever, or rheumatic heart disease may result.
5. In laryngitis, the tissues below the level of the epiglottis are swollen and inflamed, preventing the vocal cords from vibrating normally, which results in hoarseness of the voice.
6. Tonsillitis is an infectious condition characterized by inflamed and enlarged tonsils, fever, painful swallowing, sore throat, and a slight change in voice.
7. Hay fever may be seasonal (i.e., caused by airborne pollens and fungal spores associated with that season) or perennial (i.e., occurs year-round if the patient is continually exposed to allergens).
8. Bronchitis may be acute or chronic, and it is characterized by bronchial swelling, mucus secretion, and increased resistance to expiration.
9. Asthma is caused by a constriction of bronchial smooth muscles (bronchospasm), increased bronchial secretions, and mucosal swelling, each leading to inadequate airflow during respiration (especially during expiration). Wheezing, a common sign of asthma, results from air squeezing past the narrowed airways. The condition is classified as intermittent, seasonal, or chronic, and it is managed with bronchodilators, aerosol corticosteroids, and cromolyn sodium.

10. EIB affects up to 90% of those with asthma and up to 35% of those without known asthma. Key signs are a dry, regular cough within 8 to 10 minutes of the start of moderate exercise as well as stomach cramps after exercise.
11. Rapid onset of fever, chills, malaise, headache, general muscle aches, hacking cough, and inflamed mucous membranes indicates the onset of influenza, or "the flu." Initial treatment consists of rest, plenty of clear fluids, salt water gargles, cough medication, and analgesics to control fever, aches, and pains.
12. Viral pneumonia, which strikes primarily during the fall and winter, tends to start with a dry and nonproductive cough, headache, fever, muscle pain, and fatigue. As the condition progresses, the patient becomes short of breath, develops a cough that produces phlegm, and runs the risk of developing a secondary bacterial pneumonia.

APPLICATION QUESTIONS

1. Athletes often get colds and influenza during their competitive season. What strategies in the athletic training facility can be used to decrease the risk of getting a cold or decreasing the severity of a cold?
2. A 15-year-old previously diagnosed with asthma would like to improve his cardiovascular endurance without triggering exercise-induced bronchospasm. What activities might be recommended, and what guidelines should be followed in developing an exercise program for this individual?
3. A volleyball player has suddenly developed a headache, queasy stomach, general body aches, and has a slight body chill. What open-ended questions might you ask to confirm your suspicion that the individual may be developing the flu?
4. You are providing athletic training coverage for a recreational soccer

tournament. Prior to the start of the first game, a 17-year-old male has an asthma attack. The individual does not have his inhaler. However, one of his teammates has an inhaler. Would you suggest that the individual use his teammate's inhaler? Explain your response.

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