

# CHAPTER Nursing Care 37 of Clients with Upper Respiratory Disorders

## LEARNING OUTCOMES

- Relate anatomy and physiology of the upper respiratory tract to commonly occurring disorders and risk factors for these disorders.
- Describe the pathophysiology of common upper respiratory tract disorders, relating their manifestations to the pathophysiologic process.
- Discuss nursing implications for medications and other interdisciplinary care measures to treat upper respiratory disorders.
- Describe surgical procedures used to treat upper respiratory disorders and their implications for client care and recovery.
- Identify health promotion activities related to reducing the incidence of upper respiratory disorders, describing the appropriate population and setting for implementing identified measures.
- Discuss treatment options for oral and laryngeal cancers with their implications for the client's body image and functional health.

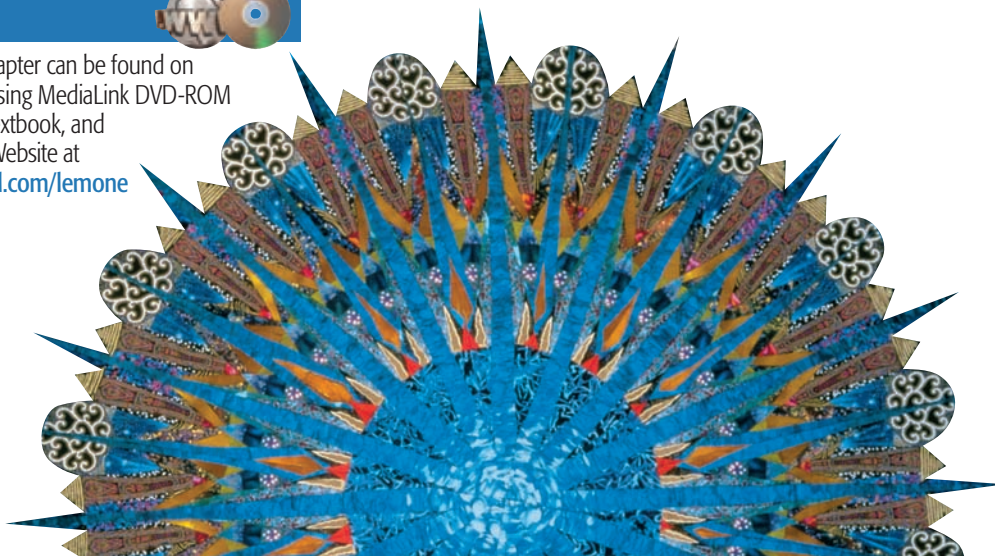
## CLINICAL COMPETENCIES

- Assess functional health status of clients with upper respiratory disorders, using data to identify and prioritize holistic nursing care needs.
- Use nursing research and evidence-based practice to plan and implement nursing care for clients with upper respiratory disorders.
- Provide safe and effective nursing care for clients having surgery involving the upper respiratory system and/or with a tracheostomy.
- Safely and knowledgeably administer medications and prescribed treatments for clients with disorders of the upper respiratory tract.
- Provide appropriate teaching for the client and family affected by upper respiratory tract disorders.
- Evaluate the effectiveness of care, reassessing and modifying the plan of care as needed to achieve desired client outcomes.

### MEDIALINK



Resources for this chapter can be found on the Prentice Hall Nursing MediaLink DVD-ROM accompanying this textbook, and on the Companion Website at <http://www.prenhall.com/lemone>

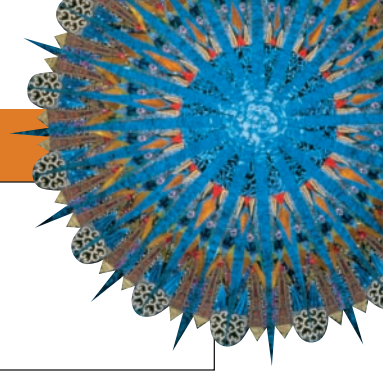


## KEY TERMS

**coryza**, 1229  
**epistaxis**, 1243  
**influenza**, 1231  
**laryngectomy**, 1255

**laryngitis**, 1241  
**pertussis**, 1242  
**pharyngitis**, 1238  
**rhinitis**, 1229

**rhinoplasty**, 1246  
**sinusitis**, 1235  
**sleep apnea**, 1250  
**tonsillitis**, 1238



Upper respiratory disorders may affect the nose, paranasal sinuses, tonsils, adenoids, larynx, and pharynx. Upper respiratory disorders may be minor, such as the common cold. However, a patent upper airway is necessary for effective breathing. Acute and even life-threatening problems develop when upper airway patency is affected (e.g., by laryngeal edema). Upper respiratory disorders can affect breathing, communication, and body image. When breathing is compromised

because of swelling, bleeding, or accumulation of secretions, fear and anxiety develop.

Nursing care focuses on maintaining the airway, managing pain and symptoms, promoting effective communication, and providing psychologic support for the client and family. Prior to proceeding with this chapter, review the anatomy and physiology, diagnostic tests, and assessment of the upper respiratory system in Chapter 36 ∞ as needed.

## INFECTIOUS OR INFLAMMATORY DISORDERS

Constant exposure of the upper respiratory tract to the environment makes it vulnerable to a variety of infectious and inflammatory conditions. Although most upper respiratory infections and inflammations are minor, complications may result. In the frail older adult, the risk of serious problems following an upper respiratory infection can be significant.

**Rhinitis**, inflammation of the nasal cavities, is the most common upper respiratory disorder. Rhinitis may be either acute or chronic. *Acute viral rhinitis*, or the common cold, is discussed below. Chronic rhinitis includes allergic, vasomotor, and atrophic rhinitis. *Allergic rhinitis*, or hay fever, results from a sensitivity reaction to allergens such as plant pollens. It tends to occur seasonally. The etiology of *vasomotor rhinitis* is unknown. Although its manifestations are similar to those of allergic rhinitis, it is not linked to allergens. *Atrophic rhinitis* is characterized by changes in the mucous membrane of the nasal cavities.

### THE CLIENT WITH VIRAL UPPER RESPIRATORY INFECTION

Viral upper respiratory infections (URIs or the common cold) are the most common respiratory tract infections and are among the most common human diseases. URIs are highly contagious and are prevalent in schools and work environments. The incidence of acute URI peaks during September and late January, coinciding with the opening of schools, as well as toward the end of April. Most adults experience two to four colds each year (Porth, 2005).

#### FAST FACTS

- Rhinoviruses are the most common cause of viral URIs.
- Colds due to rhinovirus are more common in early fall and late spring.
- More than 100 different serotypes of rhinovirus have been identified.
- Parainfluenza viruses, respiratory syncytial viruses (RSV), coronaviruses, and adenoviruses also can cause URIs.
- Colds due to RSV, coronavirus, and adenovirus peak in winter and spring (Porth, 2005).

### Pathophysiology

More than 200 strains of virus cause URI, including rhinoviruses, adenoviruses, parainfluenza viruses, coronaviruses, and respiratory syncytial virus (see the section that follows for more information about RSV). Occasionally, more than one virus may be present. Viruses causing acute URIs spread by aerosolized droplet nuclei during sneezing or coughing or by direct contact. The virus usually spreads when the hands and fingers pick it up from contaminated surfaces and carry it to the eyes and mucous membranes of the susceptible host. Infected clients are highly contagious, shedding virus for a few days prior to and after the appearance of symptoms. Although immunity is produced to the individual virus strain, the number of viruses causing URI ensures that most people continue to experience colds throughout their lifetimes.

Viscous mucous secretions in the upper respiratory tract trap invading organisms, preventing contamination of more vulnerable areas. Cells of the upper respiratory tract are infected when the virus attaches to receptors on the cell. Local immunologic defenses, such as secretory IgA antibodies in respiratory secretions, then attempt to inactivate the antigen, producing a local inflammatory response. The mucous membranes of the nasal passages swell and become hyperemic and engorged. Mucus-secreting glands become hyperactive. These responses to the virus produce the typical manifestations of viral URI.

### Manifestations and Complications

Acute viral upper respiratory infection often presents as the common cold. Nasal mucous membranes appear red (*erythematous*) and *boggy* (swollen). Swollen mucous membranes, local vasodilation, and secretions cause nasal congestion. Clear, watery secretions lead to **coryza**, profuse nasal discharge. Sneezing and coughing are common. Sore throat is common, and may be the initial symptom. Systemic manifestations of acute viral URI may include low-grade fever, headache, malaise, and muscle aches. Symptoms generally last for a few days up to 2 weeks. Although acute viral URI is typically mild and self-limited, its effects on the immune defenses of the upper respiratory tract can increase

the risk for more serious bacterial infections, such as sinusitis or otitis media.

## INTERDISCIPLINARY CARE



Because most acute viral upper respiratory infections are self-limiting, self-care is appropriate and encouraged. Medical treatment is usually required only when complications such as sinusitis or otitis media develop.

Diagnosis of acute viral URI is usually based on the history and physical examination. Diagnostic testing may be indicated if a complication such as bacterial infection is suspected. A white blood count (WBC) may be ordered to assess for leukocytosis (an elevated WBC). Cultures of purulent discharge may also be obtained.

Treatment is symptomatic. Adequate rest, maintaining fluid intake, and avoiding chilling help relieve systemic symptoms such as fever, malaise, and muscle ache. Instruct clients to

cover the mouth and nose with tissue when coughing or sneezing, and to dispose of soiled tissues properly. Additionally, avoiding crowds helps prevent spread of the infection to others.

## Medications

Medications may be recommended to shorten the duration of the illness and relieve symptoms. Mild decongestants or over-the-counter (OTC) antihistamines may help relieve coryza and nasal congestion. Nasal sprays such as phenylephrine (Neo-Synephrine) rapidly relieve nasal congestion, but may lead to dependence and rebound congestion if used for more than a few days at a time. Warm saltwater gargles, throat lozenges, or mild analgesics may be used for sore throat. Although no specific antiviral therapy has been shown to be effective in shortening the duration of a URI, experimental vaccines to prevent acute viral URI are in developmental stages. For the nursing implications of decongestants and common antihistamines see the box below.

### MEDICATION ADMINISTRATION Decongestants and Antihistamines



#### DECONGESTANTS

##### Phenylephrine (Neo-Synephrine, others)

##### Phenylpropanolamine (Comtrex, Ornade, Triaminic, others)

##### Pseudoephedrine (Sudafed, Actifed, others)

Decongestants promote vasoconstriction, reducing the inflammation and edema of nasal mucosa and relieving nasal congestion. They are very effective when applied topically (by nasal spray) because of their rapid onset of action. However, the duration of effect is short, followed by vasodilation and rebound congestion. Because of their rapid effect and short duration, these preparations are habit forming. Chronic use may lead to *rhinitis medicamentosa*, a rebound phenomenon of drug-induced nasal irritation and inflammation.

#### Nursing Responsibilities

- Assess for contraindications, such as hypertension or chronic heart disease. These drugs stimulate the sympathetic nervous system, increasing peripheral vascular resistance, blood pressure, and heart rate.
- Evaluate medication regimen for potential interactions such as antihypertensive medications and monoamine oxidase (MAO) inhibitors.

#### Health Education for the Client and Family

- Do not use more than the recommended dose.
- Check with the physician before taking decongestants if you are taking any prescription medications or are being treated for high blood pressure or heart disease.
- Use nasal sprays for no more than 3 to 5 days.
- Increase fluid intake to relieve mouth dryness.
- These drugs may cause nervousness, shakiness, or difficulty sleeping. Stop the drug if these effects occur.
- In some states, drugs containing pseudoephedrine may require a prescription or be kept behind the counter to reduce its use in preparing methamphetamine.

#### ANTIHISTAMINES

##### Brompheniramine (Dimetane, others)

##### Chlorpheniramine (Chlor-Trimeton, others)

##### Clemastine (Tavist)

##### Dexchlorpheniramine (Dexchlor, others)

##### Diphenhydramine (Benadryl, others)

##### Triprolidine (Actidil, Mydil)

#### Nonsedating

##### Cetirizine (Zyrtec)

##### Fexofenadine (Allegra)

##### Loratadine (Claritin)

Antihistamines are widely available with and without a prescription. They are frequently combined with decongestants in over-the-counter cold and allergy preparations. Antihistamines relieve the systemic effects of histamine and dry respiratory secretions through an anticholinergic effect. Most antihistamines cause drowsiness; nonsedating forms are less likely to interfere with alertness. Diphenhydramine is used in numerous over-the-counter sleep aids as well as in cold and allergy preparations.

#### Nursing Responsibilities

- Before administering or recommending these drugs, assess for possible contraindications, including the following:
  - Acute asthma or lower respiratory disease that may be aggravated by drying of secretions
  - Hypersensitivity to antihistamines
  - Glaucoma (increased intraocular pressure)
  - Impaired gastrointestinal motility or obstruction
  - Prostatic hypertrophy or other urinary tract obstruction
  - Heart disease.
- For clients who must remain alert while on antihistamine therapy, recommend nonsedating forms.

#### Health Education for the Client and Family

- Do not drive or operate machinery while taking over-the-counter or prescription forms of antihistamines known to be sedating.
- Stop the drug and notify your doctor immediately if you develop confusion, excessive sedation, chest tightness, wheezing, bleeding, or easy bruising while taking antihistamines.
- Do not use alcohol or other CNS depressants while taking antihistamines.
- Hard candy, gum, ice chips, and liquids help relieve mouth dryness caused by antihistamines.

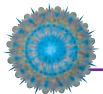
## Complementary Therapies

Complementary therapies are appropriate for treating most acute viral URI. Herbal remedies such as echinacea and garlic may have antiviral and antibiotic effects (Fontaine, 2005). Echinacea also is thought to stimulate the immune system, improving the body's response to infection. Taken at the first sign of infection, echinacea may reduce the duration and symptoms, although clinical trials have shown no consistent benefit (National Center for Complementary and Alternative Medicine, 2005). The recommended dose of echinacea varies, depending on the part of the plant used in the preparation. It should not be used for longer than 2 weeks. It is contraindicated for use during pregnancy and lactation, and in people who have an autoimmune disease such as rheumatoid arthritis.

Dietary supplements such as vitamin C and zinc also are promoted as measures to reduce the severity and duration of URI. Again, however, no consistent benefit is demonstrated in clinical trials. Although selected studies have shown a beneficial effect of zinc gluconate lozenges to reduce the duration of an induced URI, no such benefit was found when zinc was compared with placebo to treat naturally occurring URI (National Institutes of Health, 2002).

Aromatherapy with essential oils such as basil, cedarwood, eucalyptus, frankincense, lavender, marjoram, peppermint, or rosemary can reduce congestion and promote comfort and recovery. Teach clients that these essential oils are to be used only for inhalation, not for internal consumption.

Acupuncture and acupressure have been shown to be effective in treating URI in adults, particularly when combined with use of Chinese herbs (Spencer & Jacobs, 2003). Their beneficial effect is most likely related to stimulation of the immune response by acupuncture and acupressure.



## NURSING CARE

### Health Promotion

Clients can limit their incidence of acute viral URI by frequent hand washing and avoiding exposure to crowds. Maintaining good general health and stress-reducing activities support the immune system and help prevent acute viral URI. Teach the client that becoming chilled or going out in the rain do not cause colds, and that URI are more likely to occur during periods of physical or psychologic stress.

### Community-Based Care

The primary nursing role in caring for clients with acute viral URI is educational. Self-care is appropriate for most clients unless the problem is recurrent or a complication occurs. Acute viral URI may interfere with work and recreational activities. Unless limited by symptoms, normal daily activities and roles usually can be maintained. Additional rest during the acute phase of illness is recommended. Additional fluid intake and a well-balanced diet help support the immune response, hastening recovery.

Include the following topics in teaching for home care:

- Using disposable tissues to cover the mouth and nose while coughing or sneezing to reduce airborne spread of the virus

- Blowing the nose with both nostrils open to prevent infected matter from being forced into the eustachian tubes
- Washing hands frequently, especially after coughing or sneezing, to limit viral transmission
- Using OTC preparations for symptomatic relief; precautions related to the sedating effects of antihistamines
- Limiting use of nasal decongestants to every 4 hours for only a few days at a time to prevent rebound effect.

## THE CLIENT WITH RESPIRATORY SYNCYTIAL VIRUS

*Respiratory syncytial virus (RSV)* is a common virus that is the primary cause of respiratory illnesses in young children and the majority of lower respiratory disease in infants. Older children and adults also are commonly and repetitively infected by RSV, but the disease is milder, usually presenting as a common cold. However, the elderly and people who are immunocompromised may develop severe pneumonitis when exposed to RSV (Kasper et al., 2005). The disease may be fatal among people who have undergone or are preparing to undergo bone marrow transplant (Tierney et al., 2005).

RSV is transmitted in much the same way as other URI: via contaminated hands or objects and by coarse droplets spread by coughing and sneezing. The incubation period is 4 to 6 days.

In adults, the manifestations of RSV are those of other common URI, including rhinorrhea, sore throat, and cough. Headache, malaise, and low-grade fever may occur. In older adults, RSV may present as lower respiratory infection with fever or pneumonia (Kasper et al., 2005). While the illness also presents as URI in infants, it is more likely to progress to pneumonia, bronchiolitis, and tracheobronchiolitis in this population.

Treatment for adults with upper respiratory RSV is symptomatic (see the preceding section on URI). When the lower respiratory tract is involved, hydration and other measures to mobilize respiratory secretions are important. Intubation and mechanical ventilation may be necessary if hypoxia develops. Aerosolized ribavirin (Virazole, an antiviral drug) may be prescribed for older adults and immunocompromised clients with RSV pneumonia.

Nursing care is supportive. The focus of nursing care for the adult with URI manifestations of RSV is on teaching for self-care, identification of complications, and prevention of viral spread. When lower respiratory symptoms are present, nursing care is similar to that provided for clients with pneumonia (see Chapter 38 ∞).

## THE CLIENT WITH INFLUENZA

**Influenza**, or *flu*, is a highly contagious viral respiratory disease characterized by coryza, fever, cough, and systemic symptoms such as headache and malaise. Influenza usually occurs in epidemics or pandemics, although sporadic cases do occur. Localized outbreaks of influenza usually occur about every 1 to 3 years. Global epidemics (pandemics) are less frequent, developing every 10 to 15 years until the past two decades. A recently identified strain of avian (bird) influenza has raised

concerns about a potential future pandemic. This strain of influenza virus has not yet demonstrated the ability to spread between humans; however, concerns are that it will mutate to allow person-to-person spread. This viral strain has a mortality rate of greater than 50% in people who have been infected due to close association with infected birds. See Box 37–1 for more information about avian influenza.

Although influenza tends to be mild and self-limited in healthy adults, older adults and people with chronic heart or pulmonary disease have a high incidence of complications (such as pneumonia) and a higher risk for mortality related to the disease and its complications (Kasper et al., 2005).

## Pathophysiology

Influenza virus is transmitted by airborne droplet and direct contact. Three major strains of the virus have been identified as influenza A virus, influenza B virus, and influenza C virus. Influenza A is responsible for most infections and the most severe outbreaks of influenza. This is primarily due to its ability to alter its surface antigens, bypassing previously developed immune defenses to the virus. New strains of influenza virus are named according to the strain, geographic origin, and year the strain was identified (e.g., A/Taiwan/89). Surface antigens of the specific virus may be used to further differentiate influenza A viruses. Outbreaks of influenza B virus are generally less extensive and less severe than those caused by

influenza A virus. Illness associated with influenza C virus is mild and often goes unrecognized.

### FAST FACTS

- Type A influenza viruses are found in birds, pigs, whales, and humans.
- Type A influenza is believed to have caused three pandemics, in 1918, 1957, and 1968.
- Type B influenza viruses are commonly found among humans, and often are responsible for influenza outbreaks but not pandemics.
- Type C influenza viruses, found in humans, pigs, and dogs, typically cause mild respiratory infections (National Institute of Allergy and Infectious Diseases, 2006).

The incubation period for influenza is short, only 18 to 72 hours. The virus infects the respiratory epithelium. It rapidly replicates in infected cells and is released to infect neighboring cells. Inflammation leads to necrosis and shedding of serous and ciliated cells of the respiratory tract. This allows extracellular fluid to escape, producing rhinorrhea. With recovery, serous cells are replaced more rapidly than ciliated cells, leading to continued cough and coryza. Systemic manifestations of influenza likely are caused by release of inflammatory mediators such as tumor necrosis factor alpha, interleukin alpha, and interleukin 6 (Kasper et al., 2005). The humoral and cell-mediated immune responses


### BOX 37–1 Focus on Avian Influenza

Influenza viruses are common in nature, found in wild birds such as ducks and shore birds. Although these birds carry the virus, they usually are not harmed by it. Movement of the virus into domesticated flocks of ducks and chickens can not only devastate populations of these birds, but can also spread the virus to other domestic animals such as pigs.

Avian influenza is caused by a type A influenza virus identified as H5N1. Type A influenza viruses are subclassified by two proteins found on the surface of the virus, hemagglutinin (HA) and neuraminidase (NA). HA allows the virus to attach to a cell and initiate an infection, whereas NA allows the virus to exit the host cell after replicating. Currently, there are only three known subtypes of influenza A circulating among humans (H1N1, H1N2, and H3N2). The H5N1 virus, which is particularly virulent and spread by migratory birds, raises fears of a potential human pandemic should it evolve to become transmissible from human to human. Influenza viruses are very changeable, undergoing small, continuous changes as well as occasional large and abrupt changes. *Antigenic drift* is the term for small changes that occur continuously as a virus makes copies of itself. These changes help the virus elude the immune system, and necessitate the production of new vaccines every year. Sudden, dramatic changes occur when two different strains of influenza virus (for example, avian influenza and human influenza) infect the same cell and exchange genetic material. These changes, called *antigenic shift*, create a new subtype of the virus to which people have little or no immunity.

As of March 2006, the World Health Organization (WHO) reported a cumulative total of 186 confirmed human cases of avian

influenza A, with the majority of these cases occurring in Viet Nam. Among these confirmed cases, more than half of the people infected died (105 deaths) (WHO, 2006). It is important to note that the cases being reported probably represent the most seriously ill people and milder infections may not be reflected in reported numbers. Most reported cases of avian influenza A have occurred in previously healthy children and young adults.

Symptoms of avian influenza include typical flulike manifestations such as fever, cough, sore throat, and myalgias. In addition, affected people may develop eye infections, pneumonia, and respiratory distress, including acute respiratory distress syndrome (ARDS; see Chapter 39  for more information about ARDS and its manifestations).

No vaccine to protect against H5N1 virus has yet been developed for commercial use. Measures are being taken, however, to develop pre-pandemic vaccines based on current strains of H5N1 influenza virus, to increase the capacity for vaccine production in the United States, and to research new types of vaccines. Some currently available antiviral medications may effectively treat avian influenza; however, the virus implicated in deaths in southeast Asia was found to be resistant to amantadine and rimantadine, two commonly used drugs to treat influenza (General information, 2006).

A severe pandemic of avian influenza could disrupt all aspects of life, not only causing severe illness and death, but also overwhelming the healthcare system, impacting social services, and causing significant economic loss. Advance preparations such as those currently being undertaken by the WHO and the United States and other countries can reduce the impact of a pandemic.

are activated by influenza infection, and are supplemented by other local and systemic responses (such as interferons).


## Manifestations

Infection with influenza virus produces one of three syndromes: uncomplicated nasopharyngeal inflammation, viral upper respiratory infection followed by bacterial infection, or viral pneumonia. The onset is rapid; profound malaise may develop in a matter of minutes.

Manifestations of influenza include abrupt onset of chills and fever, malaise, muscle aches, and headache. Respiratory manifestations include dry, nonproductive cough, sore throat, substernal burning, and coryza (see the box below). Acute symptoms subside within 2 to 3 days, although fever may last as long as a week. The cough may be severe and productive. Along with fatigue and weakness, the cough can persist for days or several weeks.

## Complications

The respiratory epithelial necrosis caused by influenza increases the risk for secondary bacterial infections. Sinusitis and otitis media are frequent complications of influenza. Tracheobronchitis, inflammation of the trachea and bronchi, may develop. Although tracheobronchitis is not a serious health risk, its manifestations may persist for up to 3 weeks.

Influenza is clearly linked to an increased risk for pneumonia, particularly in older adults. Changes in respiratory function associated with aging, including decreased effectiveness of cough and increased residual lung volume, pose little risk in the healthy older adult but greatly increase the risk for pneumonia associated with influenza. Primary influenza viral pneumonia, while uncommon, is a serious complication that may be fatal. It typically develops within 48 hours of the onset of influenza, often in clients with preexisting heart valve or pulmonary disease. Influenza pneumonia progresses rapidly and can cause hypoxemia and death within a few days. Bacterial pneumonia is more likely to occur in older at-risk adults but also may affect otherwise healthy adults. It usually presents as a relapse of influenza, with a productive cough and evidence of pneumonia on the chest x-ray. See Chapter 38  for more information about pneumonia.

Other respiratory complications of influenza include exacerbation of chronic obstructive pulmonary disease (COPD),

chronic bronchitis, or asthma. Sinusitis (discussed later in this chapter) also may develop.

*Reye's syndrome* is a rare but potentially fatal complication of influenza. Although it is more likely to affect children, it also has been identified in older adults. It is most often associated with influenza B virus. Reye's syndrome develops within 2 to 3 weeks after the onset of influenza. It has a 30% mortality rate. Hepatic failure and encephalopathy develop rapidly in clients with Reye's syndrome.

While uncommon, other potential complications of influenza include myositis (inflammation of skeletal muscles), myocarditis (inflammation of the heart muscle), and central nervous system (CNS) disorders such as encephalitis and Guillain-Barré syndrome.

## INTERDISCIPLINARY CARE

Preventing community outbreaks and protecting vulnerable populations (e.g., older adults and people with chronic diseases) are the primary focus for interdisciplinary care related to influenza. Medical treatment of influenza focuses on establishing the diagnosis, providing symptomatic relief, and preventing complications.

### Prevention


Preventing influenza by immunizing at-risk populations is an important aspect of care. Immunization with polyvalent (containing antigens of several viral strains) influenza virus vaccine is about 85% effective in preventing influenza infection for several months to a year (Tierney et al., 2005). Annual immunization is recommended for at-risk clients, including people over the age of 65, residents of nursing homes, adults and children with chronic cardiopulmonary disorders (e.g., asthma) or chronic metabolic diseases such as diabetes, and healthcare workers who have frequent contact with high-risk clients. Additionally, family members of at-risk clients should be vaccinated to reduce the client's risk of exposure. The vaccine is given in the fall, prior to the annual winter outbreak. Live attenuated vaccine, administered by intranasal spray, is available for healthy people under age 50.

### Diagnosis

The diagnosis of influenza is based on history, clinical findings, and knowledge of an influenza outbreak in the community. A chest x-ray and WBC count may be done to rule out complications such as pneumonia. The WBC count is commonly decreased in influenza; bacterial infections usually cause increased WBCs.

### Medications

Yearly immunization with influenza vaccine is the single most important measure to prevent or minimize symptoms of influenza. Although the vaccine is readily available and inexpensive, only about 30% of at-risk clients are vaccinated each year. Many may fear a reaction from the vaccine, although the vaccines are highly purified and reactions are rare. About 5% of people experience mild symptoms of low-grade fever, malaise, or myalgia for up to 24 hours after vaccination. Because the vaccine is produced in eggs, it should not be given to people who are allergic to



### MANIFESTATIONS of Influenza

#### RESPIRATORY MANIFESTATIONS


- Coryza
- Cough, initially dry becoming productive
- Substernal burning
- Sore throat

#### SYSTEMIC MANIFESTATIONS

<ul style="list-style-type: none"> <li>■ Fever and chills</li> <li>■ Malaise</li> </ul>	<ul style="list-style-type: none"> <li>■ Muscle aches</li> <li>■ Fatigue</li> </ul>
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egg protein. Serious adverse reactions to influenza vaccine are rare. Guillain-Barré syndrome, an acute neurologic disorder characterized by muscle weakness and distal sensory loss, has been associated with certain batches of vaccine.

Amantadine (Symmetrel) or rimantadine (Flumadine) may be used for prophylaxis in unvaccinated people who are exposed to the virus. If the drug is given before or within 48 hours of exposure, it inhibits viral shedding and prevents or decreases the symptoms of influenza. If possible, unvaccinated people should receive the vaccine along with the antiviral drug. The drug is continued for several weeks or for the duration of the influenza outbreak. Some strains of type A influenza virus have been found to be resistant to amantadine and rimantadine, potentially limiting their effectiveness in preventing or treating an influenza outbreak.

Amantadine, rimantadine, and the antiviral drugs zanamivir (Relenza), oseltamivir (Tamiflu), and ribavirin (Virazole) also may be used to reduce the duration and severity of flu symptoms. Both zanamivir and ribavirin are administered by inhalation; the other drugs are given orally. Zanamivir can precipitate bronchospasm in clients with a history of asthma or COPD, so it is not recommended for use in these clients (Food and Drug Administration, 2000). See Chapter 12  for nursing implications for antiviral drugs.

Over-the-counter analgesics such as aspirin, acetaminophen, or nonsteroidal anti-inflammatory drugs (NSAIDs) provide symptomatic relief of fever and muscle ache. Antitussives may decrease cough, promoting rest. Antibiotics are not indicated unless secondary bacterial infection occurs.



## NURSING CARE

### Health Promotion

Stress the importance of yearly influenza vaccination for clients in high-risk groups and their families. Teach about spread of the disease, including measures to reduce the risk of contracting influenza, such as avoiding crowds and people who are ill.

### Assessment

Unless there is a known outbreak of influenza in the community, it can be difficult to differentiate the manifestations of influenza from those of other URI.

- **Health History:** Known exposure to virus; current symptoms, their onset and duration; presence of dyspnea, chest pain, productive cough, facial pain or pressure in sinus areas; current medications, history of influenza vaccine; chronic diseases such as heart disease, COPD, or diabetes; known medication allergies.
- **Physical Examination:** General appearance; vital signs including temperature; skin color; lung sounds; abdominal exam.
- **Diagnostic Tests:** WBC, throat and sputum cultures, and chest x-ray for evidence of bacterial infection or pneumonia.

### Nursing Diagnoses and Interventions

Although the symptoms of influenza are distressing, most people with the illness provide self-care and do not contact a

healthcare provider. Recommendations to rest in bed during the acute phase of the illness and limit activities until recovery are appropriate for influenza.

Severe disease or complications of influenza may necessitate hospitalization for respiratory support and management. For these clients, nursing care focuses on maintaining airway clearance, breathing patterns, and adequate rest.

### Ineffective Breathing Pattern

Muscle aches, malaise, and elevated temperature may increase the respiratory rate and alter the depth of respirations, decreasing effective alveolar ventilation. Shallow respirations also increase the risk of *atelectasis* (lack of ventilation in an area of lung).

#### PRACTICE ALERT

Monitor respiratory rate and pattern. Tachypnea and/or rapid, shallow respirations may impair effective alveolar ventilation and gas exchange.

- Pace activities to provide for periods of rest. *Tachypnea increases the work of breathing, causing fatigue; fatigue, in turn, can further impair ventilation and reduce the effectiveness of coughing.*
- Elevate the head of the bed. *The upright position improves lung excursion and reduces the work of breathing by lowering the diaphragm, moving abdominal contents downward, creating less resistance to diaphragmatic excursion, and slightly decreasing venous return.*

### Ineffective Airway Clearance

Swelling and congestion of mucous membranes, extracellular fluid exudate, and impaired ciliary action due to cell damage increase the risk of impaired airway clearance in influenza. The older adult is at particular risk because of normally reduced ciliary activity and increased lung compliance.

#### PRACTICE ALERT

Monitor the effectiveness of cough and ability to remove airway secretions. Fatigue and general malaise may impair the ability to cough effectively and mobilize secretions.

- Maintain adequate hydration. Assess mucous membranes and skin turgor for evidence of dehydration. *Fever and decreased oral fluid intake may lead to dehydration and increased viscosity of secretions. Thick, viscous secretions are more difficult to expectorate.*
- Increase the humidity of inspired air with a bedside humidifier. *Increasing the water content of inhaled air helps loosen thick secretions and soothe mucous membranes.*
- Teach effective cough techniques. Administer analgesics as ordered. *The huff cough is effective to maintain open airways and it spares energy. (See Box 39–5 for client teaching of this technique.) Relieving muscle ache increases the ability to cough effectively.*

### Disturbed Sleep Pattern

Airway congestion, malaise, muscle aches, and persistent cough may interfere with the ability to rest, increasing fatigue and prolonging recovery.

- Assess sleep patterns using subjective and objective information. *The client may appear to be sleeping but not achieving normal sleep patterns because of influenza symptoms. Both subjective and objective data are important to accurately assess sleep.*
- Provide antipyretic and analgesic medications at or shortly before bedtime. *These drugs promote comfort by reducing fever and relieving muscle aches.*

### PRACTICE ALERT

If necessary, request a cough suppressant for nighttime use. Cough suppressants are not recommended during the day because coughing promotes airway clearance. They may, however, be necessary at night to allow rest.

### Risk for Infection

Infection control measures are recommended to prevent person-to-person transmission of influenza and control influenza outbreaks in healthcare facilities.

- Use standard precautions and encourage all staff and visitors to frequently wash hands. *Hand washing is a primary infection control measure for infections transmitted via respiratory secretions.*
- Instruct clients and visitors to control respiratory secretions by using tissues, and to maintain a distance of at least 3 feet from others when coughing or sneezing. Provide masks for clients and visitors who are unable to control secretions. *Limiting the spread of aerosolized secretions by covering the nose and mouth and maintaining distance from other people can reduce the spread of the disease to vulnerable populations.*
- Use droplet precautions for clients with suspected or confirmed influenza: private room, masks for caregivers and visitors, and a mask for the client when transporting within the facility. *These measures limit the spread of respiratory secretions.*

### Using NANDA, NIC, and NOC

Chart 37–1 illustrates linkages between NANDA nursing diagnoses, nursing interventions, and nursing outcomes for the client with influenza.

### Community-Based Care

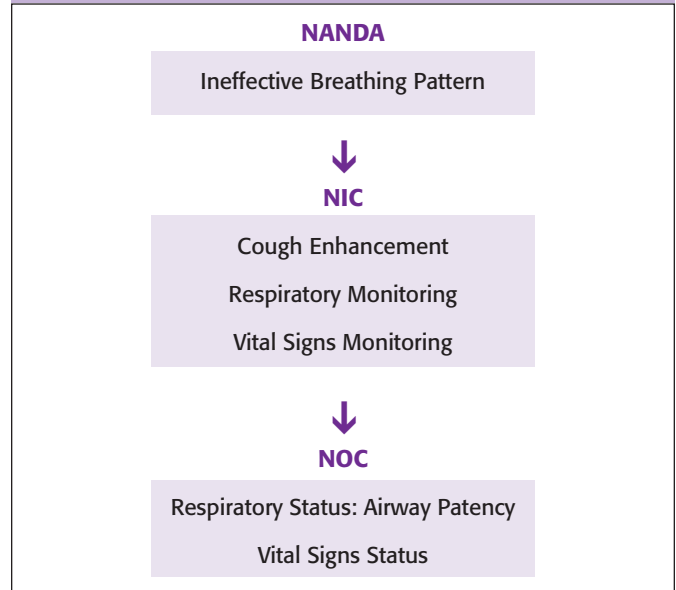
Encourage appropriate self-care for clients with influenza. Discuss the following topics related to home care:

- Increase rest during the acute, febrile phase of the illness.
- Maintain a liberal fluid intake even if anorexic.
- Appropriately use OTC medications for symptom relief.
- Employ hygiene measures such as using disposable tissues and frequent hand washing to reduce spread of the disease.
- Know manifestations of potential complications of influenza to report to the primary care provider.

## THE CLIENT WITH SINUSITIS

**Sinusitis** is inflammation of the mucous membranes of one or more of the sinuses (see Figure 36–2). Sinusitis is a common condition that usually follows an upper respiratory infection

### NANDA, NIC, AND NOC LINKAGES CHART 37–1 The Client with Influenza



Data from NANDA's *Nursing Diagnoses: Definitions & Classification 2005–2006* by NANDA International (2005), Philadelphia; *Nursing Interventions Classification (NIC)* (4th ed.) by J. M. Dochterman & G. M. Bulechek (2004), St. Louis, MO: Mosby; and *Nursing Outcomes Classification (NOC)* (3rd ed.) by S. Moorhead, M. Johnson, and M. Maas (2004), St. Louis, MO: Mosby.

such as acute viral upper respiratory infection or influenza. Common causative organisms include streptococci, *S. pneumoniae*, *Haemophilus influenzae*, and staphylococci. The risk of sinusitis is higher when the immune system is suppressed by immunosuppressive drugs or HIV infection. Sinusitis is common and difficult to treat in people who have AIDS.

### Physiology Review

The sinuses (or *paranasal sinuses*) are air-filled cavities in the facial bones that open into the turbinates of the nasal cavity. They are lined with ciliated mucous membranes that help move fluid and microorganisms out of the sinuses into the nasal cavity. The sinuses normally are sterile. Air within the sinuses has a lower oxygen content than inspired air.

### Pathophysiology

Sinusitis develops when nasal mucous membranes swell or other disorders obstruct sinus openings, impairing drainage. Mucous secretions collect in the sinus cavity, serving as a medium for bacterial growth. The nasal and sinus mucous membranes are continuous; therefore, bacteria generally spread to the sinuses via the opening into the nasal turbinates. The inflammatory response provoked by bacterial invasion draws serum and leukocytes to the area to combat the infection, increasing swelling and pressure.

Any process that impairs drainage from the sinuses may precipitate sinusitis. These include nasal polyps, deviated septum, rhinitis, tooth abscess, or swimming or diving trauma. In hospitalized clients, sinusitis may develop following prolonged nasotracheal intubation. Usually more than one sinus is infected. The frontal and maxillary sinuses are usually involved in adults.



Sinusitis may be acute or chronic. Chronic sinusitis results when acute sinusitis is untreated or inadequately treated. With continued infection, bacteria can become isolated, producing chronic inflammation. Over time, mucous membranes become thickened. Fungal infections may cause chronic infections, especially in immunosuppressed clients. Other factors that may contribute to chronic sinusitis are smoking, a history of allergy, and habitual use of nasal sprays or inhalants.

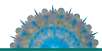
## Manifestations and Complications

The client with acute sinusitis often looks sick. Manifestations of sinusitis include pain and tenderness across the infected sinuses, headache, fever, and malaise. The pain usually increases with leaning forward. When the maxillary sinuses are involved, pain and pressure are felt over the cheek. The pain may be referred to the upper teeth. Frontal sinusitis causes pain and tenderness across the lower forehead. Infection of the ethmoid sinus produces retro-orbital pain and pain over the high lateral aspect of the nose. Sphenoid sinusitis, the rarest form, may cause pain in the occiput, vertex, or middle of the head. Symptoms often worsen for 3 to 4 hours after awakening and then become less severe in the afternoon and evening as secretions drain. The intensity and location of headache pain may change as sinuses drain. In acute sinusitis, the pain is usually constant and severe. In chronic sinusitis, the pain is described as dull and may be constant or intermittent.

Other symptoms include nasal congestion, purulent nasal discharge, and bad breath. The nasal mucous membrane is red and swollen. Purulent drainage may be noted at the opening to the middle turbinate. This may be the only sign of chronic sinusitis. Swallowed secretions irritate and inflame the throat, and may cause nausea or vomiting.

Complications develop when the infection spreads to surrounding structures (Box 37–2). These include periorbital abscess or cellulitis, cavernous sinus thrombosis, meningitis, brain abscess, or sepsis. Eustachian tube edema may lead to hearing loss.

## INTERDISCIPLINARY CARE



Treatment of sinusitis focuses on restoring drainage of obstructed sinuses, controlling infection, relieving pain, and preventing complications.

### BOX 37–2 Potential Complications of Sinusitis

#### Local Complications

- Orbital cellulitis
- Subperiosteal abscess
- Orbital abscess
- Cavernous sinus thrombosis
- Mucocele
- Osteomyelitis

#### Intracranial Complications

- Meningitis
- Epidural abscess
- Subdural abscess
- Brain abscess
- Venous sinus thrombosis

## Diagnosis

The diagnosis of acute sinusitis usually can be made using the history and physical exam. Diagnostic studies such as CT scan or sinus x-rays generally are done only when sinusitis is persistent, chronic, or recurrent. See Chapter 36 for more information about diagnostic studies and their nursing implications.

- *Sinus x-rays* are evaluated. Sinuses are normally translucent because they are filled with air; affected sinuses appear cloudy or opaque. A visible air-fluid level or thickening of the sinus mucosa may be seen in infected sinuses.
- *CT scan* is a more sensitive indicator of acute and chronic sinusitis and often is performed without preceding x-rays.
- *Magnetic resonance imaging (MRI)* may be ordered if malignancy of the sinus is suspected.

## Medications

Antibiotic therapy directed at the usual organisms causing sinusitis typically is prescribed. Amoxicillin (possibly combined with clavulanate [Augmentin]), trimethoprim-sulfamethoxazole (Bactrim, Septra), cefuroxime (Ceftin), cefaclor (Ceclor), ciprofloxacin (Cipro), or clarithromycin (Biaxin) are commonly used antibiotics for sinusitis. Antibiotic therapy is continued for 10 to 14 days; occasionally a longer course is prescribed to prevent relapse. If the sinusitis does not respond to treatment with oral antibiotics, hospitalization and intravenous antibiotic therapy may be required. See Chapter 12 for nursing care related to antibiotic therapy.

Oral or topical (in the form of nasal sprays) decongestants such as pseudoephedrine or phenylephrine are also prescribed to reduce mucosal edema and promote sinus drainage. Antihistamines may decrease nasal congestion and facilitate sinus drainage, but they also tend to increase the viscosity of secretions and hinder drainage. For this reason, they may not be as effective as decongestants. Saline nose drops or sprays promote sinus drainage, as does inhalation of warm steam.

### PRACTICE ALERT

To administer topical drugs, the client's head is tilted backward and to the side on which the drops are to be instilled. The client may need to remain in position for 5 minutes to allow the drops to reach the posterior nares.

Systemic mucolytic agents such as guaifenesin may be useful to liquefy secretions, promoting sinus drainage. Aerobic exercise also promotes mucous flow and may be recommended.

## Surgery

Clients who do not respond to pharmacologic measures and who experience persistent facial pain, headache, or nasal congestion may require *endoscopic sinus surgery*. Detailed evaluation of the sinuses by CT scan is done prior to surgery. Under local or general anesthesia, a fiberoptic nasal endoscope is inserted to visualize the sinus opening. If obstruction is present, it can be removed, restoring patency and drainage. This surgery is most effective for local disease, recurrent acute sinusitis, and for removing anatomic obstructions (Way & Doherty,

2003). Clients who have endoscopic sinus surgery usually do not require nasal packing postoperatively. Instead, frequent nasal cleaning and irrigation with normal saline are performed. The client is instructed to sneeze with the mouth open and avoid blowing the nose, lifting, or straining for a week following surgery.

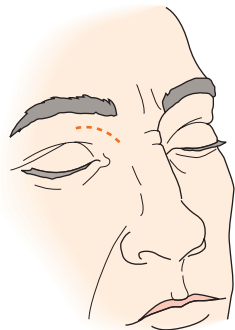
*Antral irrigation* can be done in the physician's office under local anesthesia. A 16-gauge needle is inserted under the inferior turbinate of the nose into the maxillary sinus on the affected side. Saline solution is instilled to irrigate the area and wash out the sinus of purulent exudate. The client is seated with the head forward and mouth open to allow drainage of the solution through the nose and mouth. A culture of the exudate may be obtained to determine appropriate antibiotic therapy.

The *Caldwell-Luc procedure* may be necessary if endoscopic sinus surgery is unsuccessful. It is performed under local or general anesthesia. An incision is made under the upper lip into the maxillary sinus, and diseased mucous membrane and periosteum are removed. An opening between the maxillary sinus and lateral nasal wall, a "nasal antral window," is created to increase aeration of the sinus and promote drainage into the nasal cavity. The area is packed with gauze for 24 to 48 hours postoperatively. The gauze packing obstructs nasal breathing while it is in place. As the maxillary sinus heals, exposed bone is covered by mucosa. The upper lip and teeth may be numb for several months after the procedure because of nerve trauma. Chewing may be impaired on the affected side. Only liquids are given for the first 24 hours, followed by a soft diet. The client is instructed to avoid wearing dentures and the Valsalva maneuver (no blowing the nose, coughing, or straining at stool) for about 2 weeks after the packing has been removed to prevent bleeding.

In *external sphenoidectomy*, an incision along the side of the nose from the middle of the eyebrow is used to open and remove diseased tissue from the sphenoid or ethmoid sinuses (Figure 37-1 ■). Nasal polyps may also be removed using this approach. Nasal packing is inserted, and an eye pressure patch is applied to decrease periorbital edema. Care is similar to that following the Caldwell-Luc procedure.

### Complementary Therapies

Complementary therapies may help relieve symptoms of sinusitis and promote comfort. Aromatherapy using herbs such as



**Figure 37-1** ■ Incision to access ethmoid and frontal sinuses. Resulting scar is nearly invisible in folds of the eye.

basil, marjoram, or eucalyptus in a vaporizer or on a handkerchief, herbal teas made from goldenseal, yarrow, or coltsfoot, hot or cold compresses or steam inhalation, and acupressure may be employed (Fontaine, 2005).



## NURSING CARE

### Health Promotion

Measures to prevent sinusitis are those that promote nasal drainage: encouraging liberal fluid intake, judicious use of nasal decongestants as needed, and treating any obstructive process. Encourage clients with URI to blow their nose with both nares open. Advise clients that use of saline nasal sprays can help maintain patency of the opening to the sinuses, promoting drainage and reducing the risk of obstruction and infection.

### Assessment

Focused assessment of the client with suspected sinusitis includes the following:

- **Health History:** Complaints of frontal or periorbital headache, cheek, teeth, or ear pain; timing of pain and changes in intensity over course of the day; nasal discharge or postnasal drip; other symptoms; previous sinus problems; current medications, known medication allergies.
- **Physical Examination:** General appearance; vital signs including temperature; inspect nasal and pharyngeal mucous membranes; percuss sinuses for tenderness.
- **Diagnostic Tests:** WBC and differential, cultures of sinus drainage, sinus x-rays or other imaging studies.

### Nursing Diagnoses and Interventions

The client with sinusitis is often acutely uncomfortable. Obstructed and congested sinuses cause pain and pressure that increase with position changes and leaning forward. Treatment usually is community based, making education the key nursing role. When the client is hospitalized for intravenous antibiotic therapy or sinus surgery, *Pain* and *Imbalanced Nutrition* are priority nursing diagnoses.

#### Pain

Although sinus surgery is relatively minor, both the incision and postoperative swelling can cause discomfort. Nasal packing, if used, contributes to the discomfort.

- Assess pain using a standardized pain scale. Administer analgesics as ordered. *Relief of pain promotes a feeling of well-being and enhances recovery.*
- Apply ice packs to the nose. *Cold compresses reduce swelling, control bleeding, and provide local analgesia.*
- Elevate the head of the bed to Fowler's or high-Fowler's position for 24 to 48 hours after surgery. *Elevating the operative site minimizes tissue swelling and promotes comfort.*

#### Imbalanced Nutrition: Less than Body Requirements

Postoperatively, the sense of smell, an appetite stimulus, is diminished by nasal packing. Mouth discomfort from the

incision and numbness of the upper teeth also may impact appetite and eating.

- Provide clear liquid diet progressing to soft foods as tolerated. High-calorie dietary supplements may be used. *A progressive diet is used to assess the ability to swallow without choking and allay fears. Foods high in calories and nutritional value provide for metabolic and healing requirements.*
- Monitor intake, output, and weight. *This information allows assessment of overall fluid balance and the adequacy of dietary intake.*
- Elevate the head of the bed during meals. *The upright position facilitates swallowing and minimizes risk of aspiration.*

## Community-Based Care

Teaching for clients with sinusitis and their families focuses on following through with appropriate treatment and promoting comfort. Discuss the following topics when preparing for home care:

- The importance of completing the entire course of prescribed antibiotics to achieve cure and prevent the development of antibiotic-resistant bacteria. Assist in developing a schedule that helps ensure all doses are taken.
- Measures to prevent superinfections (such as vaginitis or oral thrush) during the prolonged course of treatment (e.g., consume 8 oz of yogurt containing live bacterial cultures daily while on antibiotics).
- Use of systemic or topical decongestants to promote sinus drainage.
- Maintaining a liberal fluid intake to reduce the viscosity of mucous drainage.
- Use of a humidifier or steam inhalation to promote sinus drainage.
- Sleeping with the head of the bed elevated to a 45-degree angle and on the unaffected side to promote drainage of affected sinuses.
- Application of a warm, moist pack to the area of pain and tenderness to promote comfort.
- Notify the physician if symptoms do not improve with treatment or if signs of a complication develop, such as increased pain, and redness and swelling on the side of the nose or around the eyes.
- Postoperative instructions to prevent bleeding, such as avoiding blowing the nose for 7 to 10 days and avoiding strenuous activity such as heavy lifting for about 2 weeks.
- Use of saline nasal sprays postoperatively to keep the nasal mucosa moist.

## THE CLIENT WITH PHARYNGITIS OR TONSILLITIS

**Pharyngitis**, acute inflammation of the pharynx, is one of the most commonly identified clinical problems. Although it is usually viral in origin, pharyngitis may also be caused by bacterial infection. *Group A beta-hemolytic streptococcus* (strep throat) is the most common cause of bacterial pharyngitis. Other bacteria that may cause pharyngitis include *Neisseria gonorrhoeae*, a gram-negative diplococcus that is sexually transmitted, *Mycoplasma*, and *Chlamydia trachomatis*.

**Tonsillitis** is acute inflammation of the palatine tonsils. Although it is sometimes viral in origin, tonsillitis is usually due to streptococcal infection. The incidence of streptococcal infections is greatest between late fall and spring, especially in cold climates. Viral tonsillitis may occur in epidemics in people living in crowded conditions, such as military recruits.

## Pathophysiology and Manifestations

Pharyngitis and tonsillitis are contagious and spread by droplet nuclei. Incubation varies from a few hours to several days, depending on the organism. Viral infections are communicable for 2 to 3 days. Symptoms usually resolve within 3 to 10 days after onset.

Viral pharyngitis may be attributed to the same viruses causing the common cold: rhinovirus, coronavirus, or parainfluenza virus. Pharyngitis caused by adenovirus, influenza virus, or Epstein-Barr virus (associated with infectious mononucleosis) may be particularly severe.

Acute pharyngitis causes pain and fever. The pain may vary from a scratchy sore throat to one so painful that swallowing is difficult. Streptococcal pharyngitis is usually marked by an abrupt onset, with fever of 101°F (38.3°C) or higher, severe sore throat with dysphagia, malaise, and often arthralgias and myalgias. Anterior lymph nodes are often enlarged and tender. Exudate (pus) may be seen on the pharynx and tonsils (Figure 37–2 ■). In contrast, the onset of viral pharyngitis is often gradual, with manifestations of low-grade fever, sore throat, mild hoarseness, headache, and rhinorrhea. The pharyngeal membranes appear mildly red with vascular congestion. Infectious mononucleosis, caused by the Epstein-Barr virus, often presents as acute pharyngitis, with visible patches of exudate on the pharynx or tonsils (Kasper et al., 2005). The cervical lymph nodes are enlarged and tender as well. See the accompanying box for the manifestations of pharyngitis and tonsillitis.

In tonsillitis, the tonsils appear bright red and edematous. White exudate is present on the tonsils; pressing on a tonsil may produce purulent drainage. The uvula may also be reddened and swollen. Cervical lymph nodes are usually tender and enlarged.



**Figure 37–2 ■** The appearance of the oral pharynx and tonsils in acute pharyngitis and tonsillitis.

Source: Blphoto Associates, Photo Researchers, Inc




## MANIFESTATIONS of Pharyngitis and Tonsillitis

### LOCAL

- Sore throat
- Possible dysphagia and otalgia
- Tender, swollen anterior cervical lymph nodes
- Hoarse voice
- Red, swollen pharyngeal mucous membranes and/or tonsils
- Possible visible exudate on pharyngeal membranes and/or tonsils

### GENERAL

- Fever
- General malaise
- Arthralgia, myalgia

The client with tonsillitis complains of a sore throat, difficulty swallowing, general malaise, fever, and otalgia (pain referred to the ear). Manifestations are often more severe in adolescents and adults than in children. Infection may extend via the eustachian tubes to cause acute otitis media. This may lead to further damage such as spontaneous rupture of the eardrums and mastoiditis. See Chapter 48  for more information about otitis media.

## Complications

Although bacterial pharyngitis may be mild and indistinguishable from viral pharyngitis by its signs and symptoms, it can lead to significant complications such as abscess, scarlet fever, toxic shock syndrome, rheumatic fever, or acute poststreptococcal glomerulonephritis.

*Peritonsillar abscess*, or *quinsy*, is a potential complication of tonsillitis. It usually results from group A beta-hemolytic streptococcus infection extending from the tonsils to the surrounding tissue. The abscess causes pus formation behind the tonsil with marked swelling and asymmetric deviation of the uvula. The degree of swelling may make it difficult to swallow anything other than liquids. The client may exhibit thickening of the voice, drooling, and a tonic contraction of the muscles of mastication, called trismus.


Rare (1% to 3%) but serious complications of streptococcal pharyngitis and tonsillitis include acute glomerulonephritis and rheumatic fever, abnormal immune responses to the infection. Acute glomerulonephritis generally presents with sudden onset of hematuria, proteinuria, and less commonly, hypertension and edema within 7 to 10 days after the acute infection. Rheumatic fever typically presents 3 to 5 weeks after acute infection with fever, painful or swollen joints, rash, and heart murmur. Other complications of bacterial infection include sinusitis, otitis media, mastoiditis, and cervical adenitis.

## INTERDISCIPLINARY CARE



Both viral and bacterial pharyngitis are usually self-limited diseases. However, because of the risk for serious complications associated with streptococcal sore throat, an effort is usu-

ally made to establish an accurate diagnosis and treat bacterial pharyngitis.

- *Throat swab* is obtained and examined for streptococcus antigen using the latex agglutination (LA) antigen test or enzyme immunoassay (ELISA) testing. These tests allow rapid identification of the antigen (in as little as 10 minutes for the LA test) but are not highly sensitive. When the test is positive, treatment for strep throat is initiated. If the test is negative, the swab is cultured to ensure that streptococcus organisms are not present. Even throat cultures are not always accurate, with approximately 10% false negative and 20% false positive results. See Chapter 36  for nursing care related to obtaining a throat swab.
- *Complete blood count (CBC)* may be done on severely ill clients or to rule out other causes of pharyngitis. The WBC count is usually normal or low in viral infections and elevated in bacterial infections.

Antipyretics and mild analgesics such as aspirin or acetaminophen provide symptomatic relief for throat pain and associated myalgias. Penicillin is the drug of choice for group A streptococci. Erythromycin, amoxicillin, or cefuroxime (Ceftin, Kefurox) may be used if the client is allergic to penicillin. Antibiotic therapy is continued for at least 10 days. The client is no longer contagious after 24 hours of antibiotic therapy.

A peritonsillar abscess is drained by needle aspiration or by incision and drainage. The area is first sprayed with a topical anesthetic such as Cetacaine and then injected with a local anesthetic. The sitting position is preferred for the procedure, because it enables expectoration of blood and pus. (See the accompanying Nursing Care Plan for nursing care of the client with a peritonsillar abscess.) Tonsillectomy is done either immediately or 6 weeks after incision and drainage of peritonsillar abscess.

*Tonsillectomy* (surgical removal of the tonsils) is indicated for recurrent or chronic infections that have not responded to antibiotic therapy, hypertrophy of the tonsils with risk of airway obstruction, peritonsillar abscess, repeated attacks of purulent otitis media, and tonsil malignancy. Adenoid tissue usually is removed at the same time. Bleeding is the most significant postoperative complication of tonsillectomy, and may develop up to 2 weeks following the surgery.

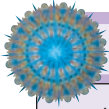


## NURSING CARE

Because of the risk of significant complications associated with streptococcal pharyngitis, encourage all clients with symptoms that persist for several days or that include fever, lymphadenopathy, and myalgias to seek evaluation and treatment.

Home care is appropriate for acute uncomplicated pharyngitis. Treatment focuses on adequate rest and relief of symptoms. A liquid or soft diet is useful when swallowing is difficult. Increased fluid intake is encouraged, especially when febrile. Warm saline gargles, moist inhalations, and application of an ice collar are soothing to the sore throat.

Following tonsillectomy, ensure a patent airway by placing the client in semi-Fowler's position with the head turned to the side to allow secretions to drain from the mouth and pharynx.



## NURSING CARE PLAN A Client with Peritonsillar Abscess

Monica Wunderman, age 27, was recently treated for tonsillitis caused by infection by group A streptococcus. She presents to the emergency department 10 days later appearing acutely ill. She states that her throat is so sore that she has difficulty swallowing even liquids. Barbara Ironhorse, the ED nurse, completes an assessment of Ms. Wunderman.

### ASSESSMENT

Findings include T 102°F (38.8°C). An acutely swollen and red-ened area of the soft palate is noted in her mouth, half occluding the orifice from the mouth into the pharynx. Yellow exudate is present. CBC reveals an elevated WBC of 16,000/mm<sup>3</sup>. A diagnosis of peritonsillar abscess is made. Needle aspiration of the abscess is performed.

### DIAGNOSES

- *Acute Pain* related to swelling
- *Risk for Ineffective Airway Clearance* related to pain and swelling
- *Deficient Fluid Volume* related to fever and difficulty in swallowing fluids

### EXPECTED OUTCOMES

- Have minimal or no pain.
- Maintain a patent airway as demonstrated by normal respiratory rate and rhythm.
- Maintain optimal fluid intake as evidenced by consumption of fluids and semiliquid foods, moist mucous membranes, normal skin turgor, and normal temperature.

### PLANNING AND IMPLEMENTATION

- Teach that ice-cold fluids may be easier to swallow than hot or room temperature beverages and may provide a local analgesic effect.
- Advise to avoid citrus juices, hot or spicy foods, and rough-textured foods for 1 week.
- Teach pain management strategies such as applying an ice collar as desired and gargling with warm saline or mouthwash solution every 1 to 2 hours for the first 24 to 48 hours after aspiration of the abscess.
- Instruct to take medications as prescribed.

### EVALUATION

When Ms. Ironhorse contacts Ms. Wunderman by telephone 2 days after her visit to the emergency department, she reports complete relief of symptoms. She is afebrile, taking fluids without difficulty, and has had no difficulty breathing. She has not experienced any pain.

### CRITICAL THINKING IN THE NURSING PROCESS

1. Describe common symptoms of infectious or inflammatory diseases of the upper airway and discuss methods of symptom relief.
2. Describe common pharmacologic interventions for these disorders.
3. What themes of nursing diagnoses emerge for clients with these types of disorders?

*See Evaluating Your Response in Appendix C.*

Keep the airway in place until the gag and swallowing reflexes have returned. Apply an ice collar to reduce swelling and pain. Notify the surgeon immediately if excessive bleeding or hemorrhage occurs. If there is no bleeding, allow water and cracked ice as desired. Warm saline mouthwashes are helpful in managing thick oral secretions following tonsillectomy. A liquid or semiliquid diet is recommended for several days.

## Community-Based Care

Discuss the following topics when preparing the client for home care:

- The importance of completing the full 10 days of antibiotic therapy if prescribed
- Using warm saline gargles or throat lozenges for symptomatic relief
- Signs and symptoms of possible complications of streptococcal infection such as glomerulonephritis or rheumatic fever
- Monitoring temperature in the morning and evening until well to ensure that the infection has not spread to deeper tissues
- Proper use and disposal of tissues and frequent hand washing to prevent spreading the infection to others.

For the client who has had a peritonsillar abscess drainage or tonsillectomy, provide the following instructions:

- Postoperative mouth and throat care
- Avoiding use of aspirin for 2 weeks to reduce the risk of postoperative bleeding

- Manifestations of bleeding to report to the physician (delayed hemorrhage may occur for up to 1 week postsurgery).

## THE CLIENT WITH A LARYNGEAL INFECTION

The larynx, located between the upper airways and the lungs, protects the lower respiratory tract from inhaled substances other than air, and allows speech. The larynx includes the epiglottis, which covers the larynx during swallowing, and the glottis, or vocal cords. Either portion of the larynx may become inflamed.

### Epiglottitis

*Epiglottitis*, inflammation of the epiglottis, is an uncommon disorder that presents as a medical emergency. *H. influenzae* infection is the most common cause of epiglottitis. Epiglottitis is a rapidly progressive cellulitis that begins between the base of the tongue and the epiglottis. The epiglottis itself becomes swollen and inflamed; swelling of adjacent tissues pushes the epiglottis posteriorly. This swelling and edema threaten the airway. Adults usually present with a 1- to 2-day history of sore throat, *odynophagia* (painful swallowing), dyspnea, and possibly drooling and stridor.

Using a tongue blade to view the oropharynx is avoided; this may precipitate laryngospasm and airway obstruction. The epiglottis is visualized using a flexible fiberoptic laryngoscope to

establish the diagnosis. The epiglottis appears red, swollen, and edematous. Nasotracheal intubation may be required to ensure airway patency. The client is admitted to a critical care unit and intravenous antibiotic therapy is initiated. Ceftriaxone (Rocephin), cefuroxime (Ceftin), or ampicillin/sulbactam (Unasyn) may be prescribed. If allergic to penicillin, a combination of clindamycin (Cleocin) and either trimethoprim-sulfamethoxazole (TMP-SMZ) or ciprofloxacin (Cipro) may be used. Dexamethasone, a systemic corticosteroid, is also given to suppress the inflammatory response and rapidly reduce swelling of the epiglottis.

Nursing care for the client with acute epiglottitis focuses on monitoring and maintaining airway patency. Monitor oxygen saturation continuously. Observe closely for signs of airway obstruction, including nasal flaring, restlessness, stridor, use of accessory muscles, and decreased oxygen saturation measurements. If the client is not intubated, supplies for emergency intubation should be kept in the unit. Epiglottitis is frightening for both the client and the nurse. Maintaining a calm, reassuring manner is an essential nursing role.

## Laryngitis

**Laryngitis**, inflammation of the larynx, is a common disorder that may occur alone or in conjunction with other upper respiratory infections. It is commonly associated with a viral URI such as influenza. It may also occur with bronchitis, pneumonia, or other respiratory infections. Excessive use of the voice, sudden changes in temperature or exposure to dust, irritating fumes, smoke, or other pollutants can also cause acute or chronic laryngitis. It is more common in the winter and in colder climates.

In laryngitis, the mucous membrane lining the larynx becomes inflamed; the vocal cords also may become edematous. The primary symptom of laryngitis is a change in the voice. Hoarseness or *aphonia*, complete loss of the voice, may occur. The throat is often sore and scratchy, and a dry, harsh cough may be present.

There is no specific treatment for viral laryngitis. Any identified precipitating factors such as overuse of the voice and exposure to irritants should be eliminated. Voice rest is advised, as is abstinence from tobacco and alcohol, which are chemical irritants. Treatment may also include inhaling steam or spraying the throat with antiseptic solutions. Identifying and eliminating irritants are helpful to prevent future attacks.

Impaired verbal communication is the priority nursing problem for clients with laryngitis. The meaning of messages is conveyed not only by the words used, but also by the tone and loudness of voice. Instruct to rest the voice as much as possible. Encourage speaking in short sentences or using alternate methods of communication, such as writing. Resting the voice hastens recovery and decreases throat discomfort. Advise to use soothing throat lozenges, sprays, or other comfort measures such as gargling with a warm antiseptic solution. Help identify potential irritants, such as fumes, chemicals, or cold temperature, to prevent future bouts of laryngitis.

## THE CLIENT WITH DIPHTHERIA

*Diphtheria* is an acute, contagious disease caused by *Corynebacterium diphtheriae*, a small aerobic pathogen. This

disease, which primarily affects adults, is uncommon in the United States. Waning immunity due to lack of periodic booster immunizations is the primary risk factor for diphtheria in the United States.

The disease is spread through droplet nuclei and by contamination of articles such as eating utensils. Asymptomatic carriers can be a factor in spreading this infection. People who have recovered from diphtheria can harbor bacteria in their throats for up to 4 weeks. Diphtheria is easily spread in areas where sanitation is poor, living conditions are crowded, and access to health care is limited. Immunization is readily available, and infants and children are usually immunized against diphtheria, pertussis, and tetanus concurrently.

## Pathophysiology and Manifestations

*C. diphtheriae* infects the mucous membranes of the respiratory tract and can invade skin lesions. The tonsils and pharynx are common sites of infection. Toxins released by the organism inflame mucosal surfaces of the pharynx. Exudate from inflamed tissues forms a thick, grayish, rubbery pseudomembrane over the posterior pharynx and sometimes into the trachea. This pseudomembrane adheres to inflamed, eroded surfaces and interferes with eating, drinking, and breathing. The airway may be obstructed, necessitating tracheostomy to maintain respirations. The toxins damage the heart and CNS and may cause myocarditis and paralysis of cranial or peripheral nerves.

Clients with diphtheria develop fever, malaise, sore throat, and malodorous breath. In severe cases, the neck may be warm and swollen because of lymphadenopathy. Isolated patches of gray or white exudate grow and extend to form a gray membrane that becomes progressively thicker. Dislodging the membrane often causes bleeding. Symptoms of airway obstruction, such as stridor and cyanosis, can develop quickly.

## INTERDISCIPLINARY CARE



Collaborative care goals for diphtheria are to prevent its transmission, treat the infection, neutralize toxins, and provide respiratory support. The diagnosis is confirmed by a throat culture. Gram-stain or immunofluorescent antibody stains may also be used.

Strict isolation procedures are instituted, and all contacts are screened and immunized. Booster shots are given to people who were immunized 5 or more years previously. Unimmunized contacts are treated with immunization and antibiotics.

Diphtheria antitoxin is given to neutralize free toxin and prevent further toxin production. Diphtheria antitoxin is produced in horses; a skin test for sensitivity to horse serum should precede immunization. Anaphylaxis is a risk during antitoxin therapy; epinephrine must be readily available. Antibiotics such as penicillin or erythromycin are administered to eliminate the organism.



## NURSING CARE

Clients with diphtheria require intensive nursing care. The client is placed on bed rest and monitored closely for airway

obstruction, cardiac manifestations, and CNS complications. Nutrition and fluid balance may be affected by difficulty swallowing. Upright positioning can promote fluid intake during the acute phase of the disease. Equipment for suction, emergency intubation, and tracheostomy are kept at the bedside.

### PRACTICE ALERT

Diphtheria is a reportable disease. Immediately contact the local health department and the Centers for Disease Control and Prevention (CDC) concerning all suspected and confirmed cases.

Preventing further cases of diphtheria is a nursing responsibility. Symptomatic clients are isolated and treated until two negative throat cultures are obtained. Nasopharyngeal and throat cultures are also obtained from all close contacts. Asymptomatic disease carriers are confined to home until at least 3 days of antibiotic therapy have been completed. All contacts, including hospital personnel, receive tetanus and diphtheria toxoids (Td).

## THE CLIENT WITH PERTUSSIS

**Pertussis**, or *whooping cough*, is a highly contagious acute upper respiratory infection caused by the bacterium *Bordetella pertussis*. Although it is thought to be a childhood disease that has been virtually eliminated by aggressive immunization of infants, pertussis still occurs in North America. Up to 45% of people affected by pertussis are adolescents and adults. Adults are thought to be an important reservoir for this disease (Kasper et al., 2005).

### Pathophysiology

*B. pertussis* is a gram-negative rod that is spread by respiratory droplets. The bacteria attach to ciliated epithelial cells of the nasopharynx, multiplying and invading respiratory tissues. The damage and effects of pertussis are not due to the infection itself, but to toxins produced by the bacteria. These toxins damage the mucosa and paralyze the cilia. As a result, clearance of respiratory secretions is impaired, increasing the risk for pneumonia. The toxins also prompt an inflammatory response and inhibit immune defenses.

Although immunization does not appear to confer lifetime immunity, the disease tends to be milder in adolescents, adults, and people who have been immunized. These infected individuals can, however, transmit the disease to other susceptible people, including unimmunized or underimmunized infants (Atkinson et al., 2000).

Young infants have the highest risk for complications of the disease, such as pneumonia and neurologic complications. Neurologic complications are thought to result from hypoxia due to prolonged paroxysms of coughing. Complications in adolescents and adults may occur as a result of increased intrathoracic pressure during prolonged coughing spells. These may include pneumothorax, weight loss, inguinal hernia, rib fracture, and *cough syncope* (fainting due to hypoxia) (Kasper et al., 2005).

### Manifestations

Classic pertussis follows a predictable pattern, with typical URI symptoms (coryza, sneezing, low-grade fever, and mild cough) beginning 7 to 10 days after exposure. After 1 to 2

weeks, the cough becomes more frequent, occurring in paroxysms or bursts of rapid coughs, often ending with an audible whoop caused by rapid inspiration. This whoop is less common in adolescents and adults, often delaying diagnosis. Vomiting commonly follows an episode of coughing. Coughing paroxysms vary in frequency from several per hour to 5 to 10 per day, interfering with eating and sleep. This stage of the disease, called the *paroxysmal stage*, usually lasts no more than 6 weeks, after which coughing becomes less severe and gradually resolves over a period of up to 3 months.

In adolescents and adults, pertussis is suspected when an upper respiratory infection produces a cough that persists longer than 7 days, is accompanied by vomiting, and is worse at night. See the Manifestations box below.

## INTERDISCIPLINARY CARE



Active immunization with pertussis vaccine is the primary preventive strategy for pertussis. Acellular pertussis vaccines that are effective but produce fewer adverse reactions than traditional whole-cell vaccines are available and preferred for immunization.

The diagnosis of pertussis is established by culture of nasopharyngeal secretions. However, nasopharyngeal secretions may remain positive for the organism for only about 3 weeks after the onset of symptoms, so blood tests for antibodies to the organism may be necessary to confirm the diagnosis. Lymphocytosis (elevated lymphocyte count) may be present.

Erythromycin is the antibiotic of choice to eradicate *B. pertussis* infection. TMP-SMZ may be used as an alternate to erythromycin. Hospitalization rarely is required for adults, although children and infants with severe disease often are hospitalized to prevent complications such as neurologic effects of hypoxia and malnutrition. Respiratory isolation is instituted for 5 days after antibiotic therapy is started. Prophylactic erythromycin or TMP-SMZ is prescribed for all household and close contacts of the infected client.



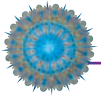
### MANIFESTATIONS of Pertussis

#### CLASSIC

- *Catarrhal phase*: coryza, malaise, low-grade fever, sneezing, cough
- *Paroxysmal phase*: frequent spasms of sometimes violent coughing, worse at night; characteristic whoop on inspiration following cough paroxysm; vomiting, fatigue, weight loss resulting from severe cough
- *Convalescent phase*: gradually decreasing frequency and severity of coughing episodes

#### ATYPICAL (OFTEN SEEN IN ADOLESCENTS AND ADULTS)

- Severe, prolonged cough that may not be paroxysmal; whoop uncommon
- Vomiting with cough
- Cough at night



## NURSING CARE

Nurses are instrumental in promoting effective immunization of all infants and young children against pertussis. Education is a key nursing role related to immunization, as significant controversy currently exists about potential long-term adverse consequences of the vaccine. Recommend that all parents request acellular vaccine due to its lower risk of adverse effects.

Recommend nasopharyngeal culture for clients complaining of persistent cough, especially when the cough is accompanied by vomiting or significantly worse at night, or if other members of the household or close contacts have a similar illness.

### PRACTICE ALERT

Pertussis is a reportable communicable disease. Report all probable and confirmed cases to the local health department and the CDC.

Education is a primary nursing role related to pertussis. Adult clients usually remain in the community for treatment.

Teach respiratory isolation measures to be used until the disease is no longer communicable. Discuss ways to control respiratory secretions, and the importance of disposing of tissues and secretions personally to prevent exposure of others. Stress the importance of prophylactic treatment for all household and close contacts. Discuss measures to maintain fluid and nutrient intake, and use of a cough suppressant at night to promote rest. Encourage increased fluid intake to promote expectoration of respiratory secretions. Teach about the prescribed antibiotic, including its potential adverse effects and measures to reduce them, such as taking erythromycin with meals to prevent gastric upset. Contact the local county health department for follow-up of contacts and compliance with prescribed treatment.

### PRACTICE ALERT

Adults should receive a diphtheria vaccine booster immunization every 10 years (usually given in combination with tetanus vaccine). A newly available diphtheria-tetanus-acellular pertussis vaccine is available for adults (CDC, 2005b).

## UPPER RESPIRATORY TRAUMA OR OBSTRUCTION

Obstruction of the upper airway due to trauma (fracture of the nasal septum or the larynx), bleeding (e.g., epistaxis), or a tumor is not only frightening for the client, it also may interfere with the ability to breathe.

### THE CLIENT WITH EPISTAXIS

The nose has a rich blood supply, receiving major arterial vessels from both the internal and external carotid artery systems. **Epistaxis**, or nosebleed, may be precipitated by a number of factors. Trauma (picking the nose or blunt trauma) can cause epistaxis, as can drying of nasal mucous membranes, infection, substance abuse (e.g., cocaine), arteriosclerosis, or hypertension. Epistaxis may also indicate a bleeding disorder related to acute leukemia, thrombocytopenia, aplastic anemia, or severe liver disease. Additionally, treatment with an anticoagulant or antiplatelet drug may cause nosebleed. In adults, men more frequently have nosebleeds than women.

### Pathophysiology and Manifestations

Ninety percent of all nosebleeds arise in the anterior nasal septum from Kiesselbach's area, a rich vascular plexus. Because of their location, these vessels are susceptible to trauma from nose picking, drying, and infection. Posterior epistaxis more often develops secondarily to systemic disorders such as blood dyscrasias, hypertension, or diabetes. In posterior epistaxis, bleeding is from the terminal branches of the sphenopalatine and internal maxillary arteries. Posterior epistaxis tends to be more severe and occurs more frequently in the older adult.

Anterior nosebleeds usually produce obvious bleeding from the nares, as well as bleeding into the posterior nasal and oral pharynx. The bleeding from a posterior nosebleed may be less

apparent, with most of the blood draining into the posterior nasopharynx and swallowed by the client. Nausea and vomiting may occur due to swallowed blood.

### INTERDISCIPLINARY CARE

The goal of treatment for epistaxis is to identify and control the source of bleeding.

Anterior bleeding can usually be managed by simple first-aid measures, such as applying pressure (pinching the nose toward the septum) for 5 to 10 minutes and applying ice packs to the nose and forehead to cause vasoconstriction. The client is placed in a sitting position to decrease blood flow to the head and reduce venous pressure. Leaning forward reduces drainage of blood backward into the nasopharynx and decreases swallowing of blood. The client is instructed to spit out the blood to help estimate the amount of bleeding and to prevent nausea and vomiting as a result of swallowed blood.

If applying pressure does not control the bleeding, medications, nasal packing, or surgery may be necessary.

### Medications

Topical vasoconstrictors such as cocaine (0.5%), phenylephrine (Neo-Synephrine) (1:1000), or adrenaline (1:1000) may be used to control anterior bleeding. These medications may be applied by nasal spray or on a cotton swab held against the bleeding site. Chemical cauterization of the bleeding vessel may be done using agents such as silver nitrate or Gelfoam. A topical anesthetic such as tetracaine, lidocaine, or cocaine may be used prior to nasal packing. If posterior nasal packing is required, prophylactic antibiotic therapy is initiated to prevent sinusitis or possible toxic shock syndrome.



## Nasal Packing

If bleeding cannot be controlled with pressure and local medications, a nasal tampon (a soft balloon filled with air) may be used to apply direct pressure to the bleeding vessel, or the nasal cavity may be packed with 0.25-inch petroleum gauze. For an anterior pack, several feet of packing are placed carefully and systematically along the floor of the nasal cavity and then into the vault of the nose. Anterior nasal packs are usually left in place for 24 to 72 hours. If epistaxis is caused by a bleeding disorder, the packing may be left in place for 4 to 5 days while the disorder is treated.

Posterior nosebleeds are more difficult to control, requiring both anterior and posterior packing (Figure 37–3 ■). Posterior packs are usually left in place for 2 to 5 days. A loose anterior nasal pack may also be inserted. Posterior nasal packing is very uncomfortable, and can cause respiratory and cardiovascular complications. Hypoxemia is common; supplementary oxygen is administered. Endotracheal intubation may be necessary to maintain adequate ventilation and gas exchange. Narcotic analgesics are prescribed to manage the discomfort. Hypertension, dysrhythmias, and even acute myocardial infarction may occur in clients with severe cardiovascular disease. Toxic shock syndrome is another potential complication of posterior nasal packing. The pack may occlude the eustachian tube and sinus openings, resulting in ear discomfort, possible otitis media, or sinusitis. Oral and nasal dryness can be minimized by use of a high-humidity face tent. Nursing care of the client with nasal packing is outlined in the box on the next page.

A Foley catheter or inflatable nasal balloon may be used as an alternative to posterior nasal packing for effective tamponade. The catheter or nasal balloon is inserted through the nose into the nasopharynx, inflated, and left in place for 2 to 3 days.

## Surgery

Chemical or surgical cautery procedures may be used to sclerose involved vessels in the anterior aspect of the nose. The resulting scab must be left undisturbed until the mucosa has healed, or further bleeding may occur.

Surgical procedures to control bleeding are often preferred to posterior nasal packing for posterior bleeding. The bleeding vessel may be cauterized using an endoscopic approach. In some cases, surgery is required to occlude the internal maxillary artery by ligation (tying off) or embolization. These procedures may be done under either conscious sedation and local anesthesia or general anesthesia. Facial paralysis, paresthesias, facial pain, and dental injury are potential complications (Way & Doherty, 2003).



## NURSING CARE

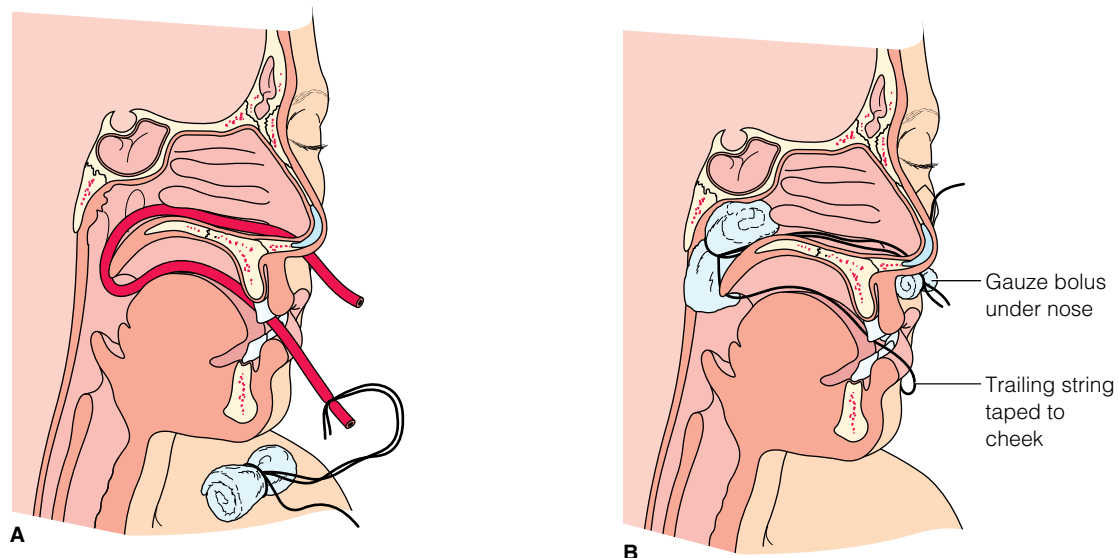
### Assessment

Nursing assessment of the client with a nosebleed focuses on the immediate problem and possible underlying conditions.

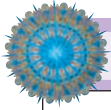
- **Health history:** Duration of current bleed; any identified precipitating factors such as trauma; history of prior nosebleeds; current medications; chronic conditions such as hypertension, bleeding disorders, and so on.
- **Physical examination:** Estimated amount of bleeding; presence of blood in oropharynx; vital signs; evidence of facial or nasal trauma.
- **Diagnostic tests:** Hemoglobin, hematocrit, and CBC as indicated; oxygen saturation; tests of organ function such as liver function tests (bilirubin, AST, ALT, LDH) or kidney function tests (serum creatinine, BUN).

### Nursing Diagnoses and Interventions

Nosebleeds can be frightening, particularly when they occur without preceding trauma. Nurses provide care for clients with



**Figure 37–3 ■** Posterior nasal packing. *A*, A rubber catheter is inserted through the nose and out the mouth and attached to the packing. *B*, The catheter is withdrawn through the nose to position the packing in the posterior nasopharynx. Ties exiting through the nose and mouth are used to stabilize the packing in position and remove it when it is no longer needed.



## NURSING CARE OF THE CLIENT WITH Nasal Packing

- Continuously monitor oxygen saturation. Administer supplementary oxygen as ordered. *Posterior nasal packing causes hypoxemia. Supplemental oxygen is given to maintain tissue oxygenation.*
- Frequently monitor vital signs and respiratory rate or pattern. *Posterior nasal packing increases the risk for respiratory and cardiovascular complications. Tachycardia and tachypnea may be early signs of cardiac or respiratory compromise.*
- Inspect the mouth and oropharynx. Notify the physician if the packing is seen in the oropharynx. *Misplacement of nasal packing can obstruct the upper airway.*
- Elevate the head of the bed. *Elevating the head of the bed facilitates ventilation.*
- Encourage deep, slow breathing through the mouth. Provide psychologic support, reassurance, and teaching. *Inability to breathe through the nose causes anxiety and fear.*
- Check for blood at the back of the throat and frequent swallowing. *Visible blood or frequent swallowing could indicate posterior bleeding.*
- Report hematemesis. *Bleeding from the posterior portion of the nose often drains down the nasopharynx and is swallowed. Hematemesis may indicate continued bleeding.*
- Apply cold compresses to nose. *An ice or cold compress decreases pain and promotes vasoconstriction, decreasing bleeding and swelling.*
- Provide for rest. *Rest reduces the metabolic demands and oxygen consumption.*
- Ensure adequate oral fluid intake. *Fluid intake helps maintain fluid balance and decreases dryness of oral mucous membranes because of mouth breathing.*
- Provide frequent oral hygiene. Use a bedside humidifier. *These measures reduce drying of oral mucous membranes and promote comfort.*

epistaxis in outpatient and emergency settings, and may care for hospitalized clients with nasal packing. Support, reassurance, and education are important nursing roles related to epistaxis. Priority nursing diagnoses include *Anxiety* and *Risk for Aspiration*.

### Anxiety

The amount of blood lost in a nosebleed can be frightening. The sensation of blood draining down the throat and inability to breathe through the nose contribute to anxiety. Spontaneous epistaxis may lead to fear of a major health problem such as high blood pressure.

#### PRACTICE ALERT

Maintain an attitude of calm reassurance. By remaining calm and confident, the nurse reassures the client that the nosebleed is not a life-threatening event.

- Instruct the client to pinch the nares together at the bridge of the nose. *Most nosebleeds are anterior in origin; direct pressure usually stops the bleeding. Having the client place pressure on the nose provides a focus and helps restore a sense of control, reducing anxiety.*
- Encourage slow, deep breathing through the mouth. *Controlled mouth breathing maintains lung ventilation and reduces anxiety.*
- Provide a basin and tissues; encourage the client to expectorate blood, not swallow it. *These measures give the client greater control and reduce the fear of choking on blood.*

#### PRACTICE ALERT

Assess the client with nasal packing frequently for adequate oxygenation. Maintain supplemental oxygen as ordered. Cerebral hypoxia produces a sense of apprehension and fear.

### Risk for Aspiration

Anxiety and blood draining into the nasopharynx increase the risk for aspiration of blood into the trachea. When nasal pack-

ing is in place, the client is unable to breathe through the nose, increasing the risk of aspiration when food or fluids are consumed.

#### PRACTICE ALERT

Position upright with the head forward. Provide a basin for expectorating blood. These measures minimize the amount of blood draining down the nasopharynx and swallowed, reducing the risk of aspiration and minimizing nausea from swallowed blood. Vomiting of swallowed blood increases the risk of aspiration.

- Apply ice or a cold compress to the nose. *Cold causes vasoconstriction, reducing bleeding.*

#### PRACTICE ALERT

Position the client with nasal packing with the head elevated and on the side when asleep. This position reduces the risk of aspiration of oral secretions.

## Community-Based Care

Following an episode of epistaxis, teaching for home care focuses on measures to prevent further bleeding. Include the following teaching topics:

- Avoid strenuous exercise for several days or weeks, depending on the severity of the nosebleed and its treatment.
- Do not blow the nose or engage in activities such as heavy lifting or bending that could increase pressure and dislodge the crust; sneeze with the mouth open to avoid increasing pressure in nasal vessels.
- For an anterior nosebleed, use petroleum jelly, a water-soluble lubricant, or bacitracin ointment to lubricate nasal mucosa and reduce the risk of spontaneous bleeding.
- Use a humidifier or vaporizer to minimize dryness of the mucous membranes.
- Do not forcefully blow the nose or pick the nose.

- For spontaneous nosebleed, seek medical evaluation for any possible underlying problem, such as hypertension or a bleeding disorder.

## THE CLIENT WITH NASAL TRAUMA OR SURGERY

The nose is the most commonly broken bone of the face. A nasal fracture (broken nose) usually is caused by a sports injury or trauma related to violence or motor vehicle crashes. The nasal septum normally divides the nose into two equal parts. Deviation of the septum can result from nasal trauma. Soft-tissue trauma commonly accompanies nasal fracture.

### Pathophysiology and Manifestations

One or both sides of the nose may be broken. A *unilateral fracture* involves only one side of the nose. It causes little displacement or cosmetic deformity. It is usually not serious, but septal deviation and swelling can obstruct the airway. *Bilateral fractures* are more common, with depression or displacement of both nasal bones to one side. The nose appears flattened or deviated with an S or C configuration. *Complex fractures* may also involve the septum, ascending processes of the maxilla, and frontal bones of the face.

Soft-tissue trauma commonly accompanies nasal fracture. Mucous membrane tears cause epistaxis. Soft-tissue hematomas (black eye) are also frequent. Swelling develops rapidly following the injury and may obscure the fracture. Bony crepitus may be felt on gentle palpation. Septal hematoma may develop, increasing the risk for infection. The manifestations of nasal fracture are listed in the box below.

### Complications

Potential complications of nasal fracture include septal hematoma and abscess formation, septal perforation or deviation, and cerebrospinal fluid (CSF) leakage. Septal hematoma can lead to complete and bilateral nasal obstruction. If undrained, hematoma increases the risk of staphylococcal abscess, which can lead to necrosis of septal cartilage and *saddle nose deformity*.

Septal deviation causes varying degrees of nasal obstruction. The septal cartilage bulges or deviates to one side, partially or totally obstructing the nares. Mild deviation is generally asymptomatic. Partial obstruction of air flow through one side may cause noisy breathing while awake and snoring during sleep. Major deviations can cause pain because of sinus

obstruction or infection. They may also cause nosebleeds due to dryness of the nasal mucosa. Occasionally, the defect is severe enough to cause cosmetic deformity. Perforations are usually not serious and do not usually require repair unless obstruction or external deformity occur.

Fractures of other facial bones may accompany a broken nose, particularly when facial trauma is severe. Fractures in the nasoethmoidal or frontal region can disrupt the dura, causing CSF leakage or rhinorrhea. CSF rhinorrhea is suspected if watery nasal drainage tests positive for glucose.

## INTERDISCIPLINARY CARE



The major treatment goals for nasal fractures are to maintain a patent airway and prevent deformity. Respirations are closely monitored.

### Diagnosis

Head and facial x-rays are done to identify the fracture and assess for other facial fractures. The intranasal cavity is examined using a nasal speculum to rule out septal hematoma. If a CSF leak is suspected, a CT scan is done. A radiopaque substance or fluorescein dye may be instilled into the intrathecal or lumbar subarachnoid space to identify the site of leakage.

### Treatments

Ideally, the fracture is reduced early, before significant edema develops. Nasal fractures heal rapidly. Simple reduction may be done in the emergency department with local anesthesia. An external splint may be applied for 7 to 10 days to maintain proper alignment until healing occurs. The splint is padded to prevent skin breakdown. Ice may be gently applied to the face and nose to control edema and bleeding. Nasal packing may be used to control epistaxis.

### Surgery

Complex nasal fractures, nasal septal deviation, or persistent CSF leakage may require surgical repair or realignment of nasal bones. Rhinoplasty with concurrent septoplasty is the most common procedure used to repair nasal fracture or a deviated nasal septum.

**Rhinoplasty** is surgical reconstruction of the nose. It is done to relieve airway obstruction and repair visible deformity of the nose following fracture. If edema is excessive after nasal fracture, surgery is delayed for 7 to 10 days to allow swelling to subside. Using an intranasal incision, the nasal skin is lifted and the framework of the nose reshaped by removing, rearranging, or augmenting bone or cartilage. The skin is then repositioned over the reconstructed frame. Prosthetic implants may help reshape the nose. Either local or general anesthesia may be used; hospitalization is often unnecessary. Following surgery, nasal packing is left in place for up to 72 hours to minimize bleeding and provide tissue support. A temporary plastic splint molded to the shape of the nose is removed in 3 to 5 days. The splint protects the reshaped nose and helps to control swelling. Most swelling and bruising subside within 10 to 14 days; normal sensation returns within several months following surgery. Rhinoplasty generally has few complications.

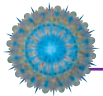


### MANIFESTATIONS of Nasal Fracture

- Epistaxis
- Deformity or displacement to one side
- Crepitus
- Periorbital edema and ecchymosis
- Nasal bridge instability

Either a septoplasty or a submucous resection may be done under local anesthesia to correct a deviated septum. *Septoplasty* involves incising one side of the septum, elevating the mucous membrane, and removing or straightening the deviated portion of septal cartilage. In a *submucous resection*, bone and cartilage are removed. In both procedures, packing is applied to both sides of the nose to prevent bleeding and to keep the septal mucosa in the midline position.

Small defects in the cribriform plate, fovea ethmoidalis, or sphenoid sinus associated with persistent CSF leakage may require endoscopic repair. Either a tissue graft or fibrin glue may be used to repair the defect. The graft or glue is held in place with absorbable packing. Large defects may require craniotomy for repair (Way & Doherty, 2003).



## NURSING CARE

### Health Promotion

Teach all people, children and adolescents in particular, about the importance of wearing helmets and facial protectors when participating in high-risk sports such as football, hockey, and baseball catching. Promote the use of seat belts with shoulder harness and air bags in vehicles to reduce the risk of facial injury in motor vehicle crashes.

### Assessment

Focused nursing assessment for the client with a suspected nasal fracture includes:

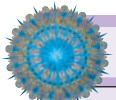
- **Health History:** Nature and circumstances of the injury; pain; ability to breathe through the nose.
- **Physical Examination:** Evident trauma, swelling, ecchymosis, or deformity of the nose; vital signs, respiratory rate and ease; gently palpate nose and facial bones for crepitus; inspect oropharynx for drainage; test nasal discharge for glucose.

### Nursing Diagnoses and Interventions

Nursing care for clients with nasal fracture focuses on controlling pain, bleeding, and swelling. Airway management is a priority. Most nasal fractures are managed on an outpatient basis, and education is a vital nursing function. See the accompanying Nursing Care Plan for additional nursing diagnoses and interventions for the client with nasal trauma.

#### Ineffective Airway Clearance

Immediately following nasal trauma and fracture, the airway is at risk for obstruction by bleeding and edema. Deformity resulting from inappropriate fracture position during healing also can impair nasal airway clearance. This is a consideration when inserting nasogastric tubes or suctioning clients with septal deviation.



## NURSING CARE PLAN A Client with Nasal Trauma

Clifton Kavanaugh is a 36-year-old mailman who broke his nose when he was hit in the face by a baseball. He is admitted to the emergency department accompanied by a friend.

### ASSESSMENT

Mr. Kavanaugh presents with obvious deformity of the nose. It is swollen, bloody, and deviated to one side. The nose is bleeding slightly. Mr. Kavanaugh rates the pain as a 6 on a scale of 1 to 10. Vital signs are BP 132/70, P 120 and regular, R 22, T 98.6°F (37°C) axillary.

Mr. Kavanaugh is breathing through his mouth and holding an ice compress to his nose. Bony crepitus and edema are felt on palpation. There is no evidence of CSF leak from either nose or ears. X-ray confirms a nasal fracture.

### DIAGNOSES

- *Acute Pain* related to nasal fracture
- *Ineffective Breathing Pattern* related to nasal swelling and bleeding
- *Anxiety* related to pain and need for emergency care
- *Disturbed Body Image* related to nasal deformity

### EXPECTED OUTCOMES

- Verbalize relief of pain.
- Maintain a patent airway and normalize the breathing pattern.
- Demonstrate reduced anxiety.
- Express concerns about potential body image change.

### PLANNING AND IMPLEMENTATION

- Administer analgesics as ordered.
- Apply ice compress to nose.
- Inspect oropharynx for evidence of bleeding.
- Encourage deep, slow breathing through the mouth.
- Provide oral hygiene.
- Discuss concerns regarding injury.
- Assist with nasal splint application.

### EVALUATION

Following treatment, Mr. Kavanaugh reports his pain has decreased to a level of 2 on a scale of 1 to 10. He appears more relaxed, no longer grimacing and with a relaxed posture. His respirations are easy at 18. The nasal splint is intact. Mr. Kavanaugh is able to look in a mirror and state with a laugh, "I look like a raccoon." He is admitted to the hospital for rhinoplasty.

### CRITICAL THINKING IN THE NURSING PROCESS

1. A client in the emergency department with nasal trauma becomes extremely panicky because of blood draining down his throat. How would you intervene to reduce this client's anxiety without using nasal suction? Why is it important to avoid suctioning the nasopharynx in the client with nasal trauma?
2. Develop a plan of care for the client with a leak of CSF from a nasal fracture.
3. Compare immediate versus delayed rhinoplasty for the client with nasal fracture.

See *Evaluating Your Response in Appendix C*.

**PRACTICE ALERT**

Monitor airway patency. Edema and bleeding may obstruct the airway, causing signs of respiratory distress such as tachypnea, dyspnea, shortness of breath, tachycardia, and use of accessory muscles.

- Monitor cough effectiveness and ability to clear airway secretions. *Pain, edema, and nasal bleeding may impair the ability to cough effectively.*

**PRACTICE ALERT**

Have suction equipment available. Airway patency is a priority; oropharyngeal suctioning may be necessary to remove secretions and maintain a clear airway. Suctioning of the nasopharynx is avoided to prevent additional tissue trauma.

- Maintain adequate hydration. Assess mucous membranes and skin turgor for evidence of dehydration. *Decreased oral fluid intake may lead to dehydration and thick, viscous secretions that are more difficult to expectorate.*
- Assess patency of both nares before inserting a nasogastric tube or feeding tube. If airflow is obstructed through one side, insert the tube through the unobstructed nare. Carefully monitor respiratory status following tube insertion. *The nasogastric tube is inserted through the unobstructed nare to avoid mucosal trauma; however, a large gastric tube may interfere with nasal breathing, necessitating close monitoring.*

**Risk for Infection**

The client with a nasal fracture is at increased risk for infection. The nasal mucosa is a natural barrier to infection, and trauma increases the risk for invasion by pathogens. Septal hematoma can lead to abscess formation and staphylococcal infection. A CSF leak indicates disruption of the dura, increasing the risk of ascending infection and meningitis.

**PRACTICE ALERT**

Test watery, clear fluid dripping from the ear or nose for glucose. CSF will test positive for glucose on a glucose test strip.

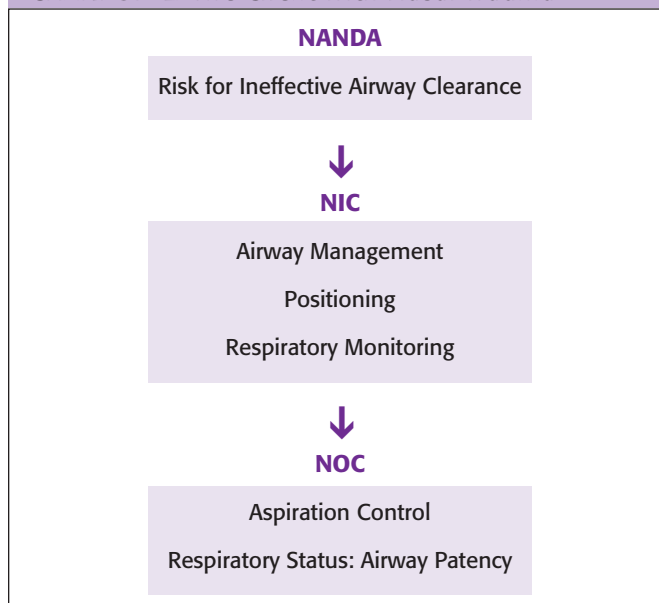
- Avoid suctioning if possible. *Suctioning catheters could introduce microorganisms and cause additional trauma to tissues.*
- Monitor vital signs every 4 hours. *A rise in temperature may indicate infection.*
- Administer antibiotics as ordered. *Antibiotics may be prescribed to prevent abscess formation, and, if CSF leakage is present, to prevent meningitis.*

**Using NANDA, NIC, and NOC**

Linkages between NANDA nursing diagnoses, nursing interventions, and nursing outcomes for the client with nasal trauma are demonstrated in Chart 37–2.

**Community-Based Care**

Provide the following teaching when preparing the client with a nasal fracture for home care:

**NANDA, NIC, AND NOC LINKAGES****CHART 37–2 The Client with Nasal Trauma**

Data from NANDA's *Nursing Diagnoses: Definitions & Classification 2005–2006* by NANDA International (2005), Philadelphia; *Nursing Intervention Classification (NIC)* (4th ed.) by J. M. Dochterman & G. M. Bulechek (2004), St. Louis, MO: Mosby; and *Nursing Outcomes Classification (NOC)* (3rd ed.) by S. Moorhead, M. Johnson, and M. Maas (2004), St. Louis, MO: Mosby.

- Elevate the head of the bed with blocks and apply ice or cold packs to the nose for 20 minutes four times a day to reduce swelling.
- Swelling usually subsides in several days; bruising may persist for several weeks.
- It is difficult to determine the final cosmetic outcome until swelling has subsided.
- If indicated by delayed fracture reduction or malformation, discuss rhinoplasty and its potential benefits.
  - If CSF leakage is present, also include the following instructions:
    - Rest in bed with the head of the bed elevated to 30 to 45 degrees.
    - Restrict fluid intake as ordered and take the prescribed diuretic to reduce intracranial pressure and CSF leakage.
    - Distribute allowed fluids throughout the day.
    - List name, purpose, effects, and precautions for any prescribed medication.
    - Avoid straining, blowing the nose, sneezing, or vigorous coughing until allowed by the physician.
    - Immediately report manifestations of infection, including stiff neck, headache, and fever, to the physician.
- Following rhinoplasty or septoplasty, provide the following instructions:
  - Apply ice packs to the nose to relieve discomfort and reduce swelling.
  - Elevate the head of the bed on blocks to decrease local edema.
  - Do not blow the nose for 48 hours after the packing is removed to prevent bleeding.
  - Vigorous coughing or straining at stool may cause bleeding and should be avoided.

- Clean teeth and mouth frequently and increase fluid intake to decrease oral dryness due to mouth breathing.
- Bruising around the eyes and nose will last for several days.

## THE CLIENT WITH LARYNGEAL OBSTRUCTION OR TRAUMA

The larynx is the narrowest portion of the upper airway. As such, it is at risk for obstruction. Laryngeal obstruction is a life-threatening emergency. Blows to the neck or other traumatic injuries may damage the larynx, interfering with its patency and function.

### Pathophysiology and Manifestations

#### Laryngeal Obstruction

The larynx may be partially or fully obstructed by aspirated food or foreign objects, or by laryngospasm or edema due to inflammation, injury, or anaphylaxis. Anything that occludes the larynx can obstruct the airway. The most common cause of obstruction in adults is ingested meat that lodges in the airway (the so-called *café coronary*). Risk factors for food aspiration include ingesting large boluses of food and chewing them insufficiently, consuming excess alcohol, and wearing dentures. A foreign body in the larynx causes pain, laryngospasm, dyspnea, and inspiratory stridor. Aspirated foreign bodies may pass through the larynx into the trachea and lungs, causing pneumonitis.

*Laryngospasm* occurs due to repeated or traumatic intubation attempts, chemical irritation, or hypocalcemia. An acute type I hypersensitivity response may cause anaphylaxis with release of inflammatory mediators, leading to angioedema of upper airways and severe laryngeal edema.

The most common manifestations of laryngeal obstruction are coughing, choking, gagging, obvious difficulty breathing with use of accessory muscles, and inspiratory stridor. As the

airway is obstructed, signs of asphyxia become apparent. Respirations are labored and noisy with wheezing and stridor. Cyanosis may develop. Respiratory arrest and death may result without prompt treatment.

#### Laryngeal Trauma

Trauma to the larynx can occur in motor vehicle crashes or assaults (e.g., blows to the neck or attempted strangulation). The larynx also may be traumatized during endotracheal intubation or tracheotomy. Trauma may fracture thyroid and/or cricoid cartilage, resulting in loss of airway patency. Soft-tissue injuries can cause swelling that further impairs the airway. Manifestations of laryngeal trauma may include subcutaneous emphysema or crepitus, voice change, dysphagia and pain with swallowing, inspiratory stridor, hemoptysis, and cough.

## INTERDISCIPLINARY CARE




The treatment goal is to maintain an open airway. If airway obstruction is partial and the client is able to cough and move air in and out of the lungs, radiologic and laryngoscopic examination may be done to locate the foreign body. An endotracheal tube may be inserted to maintain airflow through the larynx in spasm or an edematous larynx. For anaphylaxis, epinephrine may be administered to reduce laryngeal edema and relieve obstruction.

When airway obstruction due to a foreign body is complete, the Heimlich maneuver is performed immediately to clear the obstruction. For the conscious person, the rescuer wraps his or her arms around the victim from behind, places one fist between the umbilicus and xiphoid process, covers the fist with the other hand, and forcefully thrusts the hands upward (Figure 37–4A ■). For the unconscious victim, the rescuer straddles the victim's thighs and delivers thrusts upward and inward on the upper abdomen (Figure 37–4B). These moves are continued until the



**Figure 37–4** ■ Administering abdominal thrusts (the Heimlich maneuver) to **A**, a conscious victim, and **B**, an unconscious victim.

obstruction is relieved or more definitive care can be given. Endotracheal intubation may be attempted. If intubation is unsuccessful, an immediate cricothyrotomy or tracheotomy must be performed to open the airway.

CT scan is used to identify laryngeal fractures; however, emergency treatment may be required prior to diagnosis to ensure airway patency and preserve life. Soft-tissue injuries may be managed conservatively with bedside humidifier, intravenous fluids, antibiotics, and corticosteroids to reduce edema. More severe injuries require endotracheal intubation or immediate tracheostomy. Nursing care related to caring for the client with a tracheostomy is presented later in this chapter. See Chapter 39  for more information about endotracheal intubation and nursing care for the intubated client.



## NURSING CARE

### PRACTICE ALERT

The priority of nursing care in laryngeal obstruction or trauma is restoring a patent airway to prevent cerebral anoxia and death. Laryngeal obstruction and trauma are medical emergencies requiring immediate intervention.

Closely monitor clients at risk for laryngeal obstruction (e.g., following neck trauma, newly extubated clients, and people receiving medications with a high risk of anaphylaxis, such as intravenous antibiotics or radiologic dyes) for manifestations of obstruction, including dyspnea, nasal flaring, tachypnea, anxiety, wheezing, and stridor. Suction the airway as needed; small aspirated foreign bodies might possibly be removed by suctioning. If obstruction is complete, initiate a cardiopulmonary arrest procedure and perform the Heimlich maneuver until the obstruction is relieved or the emergency response team arrives. Prepare to assist with emergency intubation or tracheotomy as needed. Provide emotional support, reassurance, and teaching for the client and family to reduce anxiety.

### Community-Based Care

Health promotion and teaching for home care focus on preventing laryngeal obstruction and early intervention techniques. Everyone should be aware of the risk factors for adult aspiration. Caution clients who wear dentures to take small bites, chewing each bite carefully before swallowing. Discuss the relationship between excess alcohol intake and food aspiration. Participate in promoting training of the general public in CPR and the Heimlich maneuver. The more people who are adequately trained in emergency procedures, the more likely it is that emergency procedures will be initiated in a timely manner. Clients with a known risk for anaphylaxis, such as people with a previous anaphylactic response and those allergic to bee venom, should wear a Medic-Alert tag and carry a bee-sting kit to allow early intervention to prevent severe laryngeal edema and spasm.

## THE CLIENT WITH OBSTRUCTIVE SLEEP APNEA

**Sleep apnea**, intermittent absence of airflow through the mouth and nose during sleep, is a serious and potentially life-threatening disorder. It affects at least 2% of middle-aged women and 4% of middle-aged men. Sleep apnea is a leading cause of excessive daytime sleepiness, and may contribute to other problems such as poor work performance and motor vehicle crashes (Kasper et al., 2005; McCance & Huether, 2006). Recent studies have linked sleep apnea with an increased risk for hypertension, ischemic heart disease, and exacerbation of heart failure.

Types of sleep apnea include obstructive and central. In *obstructive sleep apnea*, the more common type, the respiratory drive remains intact, but airflow ceases due to occlusion of the oropharyngeal airway. *Central sleep apnea* is a rare neurologic disorder that involves transient impairment of the neurologic drive to respiratory muscles.

### Risk Factors

In addition to male gender, risk factors for obstructive sleep apnea include increasing age and obesity. Large neck circumference (>17 inches in men and >16 inches in women) also is a known risk factor for obstructive sleep apnea (Porth, 2005). Use of alcohol and other CNS depressants may contribute to sleep apnea.

### Pathophysiology

During sleep, skeletal muscle tone decreases (except the diaphragm). The most significant decrease occurs during rapid eye movement (REM) sleep (Porth, 2005). Loss of normal pharyngeal muscle tone permits the pharynx to collapse during inspiration as pressure within the airways becomes negative in relation to atmospheric pressure. The tongue is also pulled against the posterior pharyngeal wall by gravity during sleep, causing further obstruction. Obesity or skeletal or soft-tissue changes that decrease inspiratory tone, such as a relatively large tongue in a relatively small oropharynx, contribute to the problem. Airflow obstruction causes the oxygen saturation,  $PO_2$ , and pH to fall, and the  $PCO_2$  to rise. This progressive asphyxia causes brief arousal from sleep, which restores airway patency and airflow. Sleep can be severely fragmented because these episodes may occur hundreds of times each night.

### Manifestations

Narrowed upper airways produce loud snoring during sleep, often years before obstructive sleep apnea occurs. Excessive daytime sleepiness, headache, irritability, and restless sleep also are common manifestations. See the box on the next page.

### Complications

Recurrent episodes of apnea and arousal during sleep have secondary physiologic effects. Sleep fragmentation and loss of slow-wave sleep are thought to contribute to neurologic and behavior problems such as excessive daytime sleepiness, impaired intellect, memory loss, and personality changes. Recurrent nocturnal asphyxia and negative intrathoracic pressure due to airway

## MANIFESTATIONS of Obstructive Sleep Apnea

- Loud, cyclic snoring
- Periods of apnea lasting 15 to 120 seconds during sleep
- Gasping or choking during sleep
- Restlessness, thrashing during sleep
- Daytime fatigue and sleepiness
- Morning headache
- Personality changes, depression
- Intellectual impairment
- Impotence
- Hypertension

obstruction increase the workload of the heart. People with coronary heart disease may develop myocardial ischemia and angina. Dysrhythmias such as significant bradycardia and dangerous tachydysrhythmias may develop. Left ventricular function may be impaired and heart failure may occur. Systemic blood pressure remains high during sleep and may contribute to systemic hypertension that affects more than 50% of people with obstructive sleep apnea (Kasper et al., 2005). Pulmonary hypertension also may develop. Sudden cardiac death is believed to be a potential fatal complication of obstructive sleep apnea.

Obstructive sleep apnea is a common condition in people who are morbidly obese. When these clients undergo gastric bypass surgery to treat their obesity, sleep apnea places them at significant risk for postoperative respiratory complications. Not only does the obesity interfere with chest movement and ventilation, it increases metabolic demands and carbon monoxide production. Anesthetic and analgesics used during surgery and in the postoperative period can lead to hypoxemia due to muscle relaxation and depression of the respiratory drive (Deutzer, 2005).

## INTERDISCIPLINARY CARE

The goal of care for obstructive sleep apnea is to restore airflow and prevent the adverse effects of the disorder. Sustained weight loss may cure obstructive sleep apnea.

### Diagnosis

The diagnosis of obstructive sleep apnea is based on *polysomnography*, an overnight sleep study. Several variables are recorded during the study, including:

- Electroencephalogram and measurements of ocular activity and muscle tone
- Recordings of ventilatory activity and airflow
- Continuous arterial oxygen saturation readings
- Heart rate.

Transcutaneous arterial PCO<sub>2</sub> readings also may be monitored during the study. Because sleep studies are time consuming and expensive, overnight monitoring of oxygen saturation by pulse oximetry may be used to confirm the diagnosis of sleep apnea when symptoms indicate a high probability of the disorder (Kasper et al., 2005). Nursing implications for pulmonary function studies and pulse oximetry are presented in

Chapter 36 ∞. See Chapter 43 ∞ for more information about electroencephalography.

### Treatments

Mild to moderate obstructive sleep apnea may be treated by weight reduction, alcohol abstinence, improving nasal patency, and avoiding the supine position for sleep. Although weight reduction often cures the disorder, maintaining optimal weight is difficult. Oral appliances designed to keep the mandible and tongue forward also may be prescribed.

Nasal continuous positive airway pressure (CPAP) is the treatment of choice for obstructive sleep apnea. Positive pressure generated by an air compressor and administered through a tight-fitting nasal mask (Figure 37–5 ■) splints the pharyngeal airway, preventing collapse and obstruction. With proper training, this device is well tolerated by the client. Nasal airways can become dry and irritated with CPAP, so an in-line humidifier or a room humidifier is recommended. A newer device, the BiPAP ventilator, delivers higher pressures during inhalation and lower pressures during expiration, providing less resistance to exhaling.

### Surgery

Tonsillectomy and adenoidectomy may relieve upper airway obstruction in some clients. Excision of obstructive tissue from the soft palate, uvula, and posterior lateral pharyngeal wall may be accomplished by *uvulopalatopharyngoplasty (UPPP)*. Although only about 50% of these surgeries are successful in treating sleep apnea, UPPP is useful in selected cases. In severe cases, tracheostomy may also be performed to bypass the area of obstruction.



## NURSING CARE

Obstructive sleep apnea usually is treated in the home. Nursing care focuses on teaching the client and family about equipment use and strategies to decrease contributing factors such as obesity and alcohol intake. The following nursing diagnoses are appropriate for clients with sleep apnea:

- *Disturbed Sleep Pattern* related to repeated apneic episodes
- *Fatigue* related to interrupted sleep patterns



**Figure 37–5 ■** A client using a nasal mask and CPAP to treat sleep apnea.

Source: Custom Medical Stock Photo, Inc.



- *Ineffective Breathing Pattern* related to obstruction of upper airway during sleep
- *Impaired Gas Exchange* related to altered lung ventilation during obstructive episodes
- *Risk for Injury* related to daytime somnolence and altered judgment
- *Risk for Sexual Dysfunction* related to impotence resulting from sleep apnea.

## Community-Based Care

Effective sleep apnea management depends on the client's willingness to participate in care. Provide teaching about the following topics:

- Relationship between obesity and sleep apnea
- Plans, resources, and referrals as needed for weight loss (e.g., programs such as Weight Watchers to provide additional support)
- Relationship of alcohol and sedatives to sleep apnea; referral to an alcohol treatment program or Alcoholics Anonymous as indicated
- How to use CPAP if ordered
- The importance of using CPAP continuously at night
- Measures to reduce airway dryness, including supplemental humidity and an adequate fluid intake to maintain moist mucous membranes.

If a support group for people with sleep apnea syndrome is available in the local area, refer the client and family to the group.

## UPPER RESPIRATORY TUMORS

Although tumors of the upper respiratory tract are relatively uncommon, they have the potential to impair the upper airways and interfere with breathing and ventilation of the lungs. Of the upper respiratory tract structures, the larynx is affected by abnormal growths most often.

### THE CLIENT WITH NASAL POLYPS

*Nasal polyps* are benign grapelike growths of the mucous membrane lining the nose. These benign tumors can interfere with air movement through nasal passages or obstruct sinus openings, leading to sinusitis. They usually affect people who have chronic allergic rhinitis or asthma.

### Pathophysiology and Manifestations

Chronic irritation and swelling of the mucous membranes from allergic rhinitis may cause slow polyp formation. Polyps form in areas of dependent mucous membrane, presenting as pale, edematous masses covered with mucous membrane. They are usually bilateral and have a stemlike base, making them fairly movable. Polyps can continue to enlarge, eventually becoming larger than a grape. Polyps may be asymptomatic, although large polyps may cause nasal obstruction, rhinorrhea, and loss of sense of smell. Manifestations of sinusitis may develop. The voice may have a nasal tone. Asthmatics who have nasal polyps may have an associated aspirin allergy of which they are not aware.

### INTERDISCIPLINARY CARE

When polyps occur in conjunction with an acute upper respiratory infection, they may regress spontaneously with resolution of the infection. When symptomatic, polyps may be managed with topical corticosteroid nasal sprays or low-dose oral corticosteroids to shrink the edematous polyps and manage allergic symptoms. However, polyps continue to enlarge when corticosteroid therapy is discontinued.

Surgery may be required to restore normal breathing. Surgical removal of polyps (*polypectomy*) often is done in the physician's office under local anesthesia. A wire snare is used to clip

the polyps from their stemlike base. Nasal packing is inserted to control bleeding after removal. Alternatively, laser surgery may be used to remove polyps. Healing is more rapid following laser intervention, and the risk of bleeding is reduced. Because polyps tend to recur, repeated surgeries may be necessary.



### NURSING CARE

Teaching about home care following polypectomy is the primary nursing responsibility for the client with nasal polyps. Provide postoperative care instructions, and discuss measures to reduce the risk of bleeding.

- Apply ice or cold compresses to the nose to decrease swelling, promote comfort, and prevent bleeding.
- Avoid blowing the nose for 24 to 48 hours after nasal packing is removed.
- Avoid straining at stool, vigorous coughing, and strenuous exercise.

Discuss manifestations of possible bleeding, such as frequent swallowing or visible blood at the back of the throat. Swallowed blood may cause nausea and vomiting. Encourage the client to rest for 2 to 3 days after surgery to reduce the risk of bleeding. Instruct to increase fluid intake and clean mouth frequently to reduce oral dryness associated with mouth breathing while nasal packing is in place.

### THE CLIENT WITH A LARYNGEAL TUMOR

Laryngeal tumors may be either benign or malignant. Benign tumors of the larynx include papillomas, nodules, and polyps. People who chronically shout, project, or vocalize in an abnormally high or low tone, abusing the voice, are at risk for developing benign laryngeal tumors. In adults, vocal cord nodules are often referred to as "singer's nodules"; cheerleaders and public speakers may also develop them. Voice abuse also contributes to the development of vocal cord polyps, as does cigarette smoking and chronic irritation from industrial pollutants. Malignant tumors of the larynx, although uncommon, can have devastating effects if diagnosis and treatment is delayed.

**FAST FACTS**

- Malignancy, or cancer, of the larynx is uncommon and is often curable if detected early.
- An estimated 3770 people died from laryngeal cancer in 2005; and 9880 new cases were diagnosed (ACS, 2005a).

**Risk Factors**

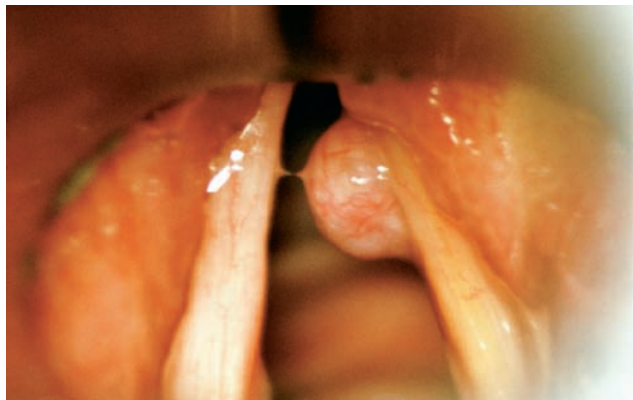
Men are affected by laryngeal cancer more than four times as often as women. Cancer of the larynx usually develops between ages 50 and 70. Tobacco use is the major risk factor for laryngeal cancer: The risk of developing laryngeal cancer is significantly greater in smokers (cigarette, pipe, or cigar) than in nonsmokers. Alcohol consumption is a significant cofactor in increasing the risk. When combined with smoking, the risk increases significantly, perhaps as much as 100 times (ACS, 2005b). Other risk factors include poor nutrition, human papillomavirus infection, exposure to asbestos and other occupational pollutants, and race (laryngeal cancer is more common in African Americans than among whites).

**Pathophysiology and Manifestations****Benign Tumors**

Papillomas are small, wartlike growths believed to be viral in origin. Polyps and nodules may develop on the vocal cords of the larynx as a result of voice abuse (Figure 37-6 ■). Nodules occur as paired lesions on the free edges of the vocal cords. Hoarseness and a breathy voice quality are manifestations of benign vocal cord tumors.

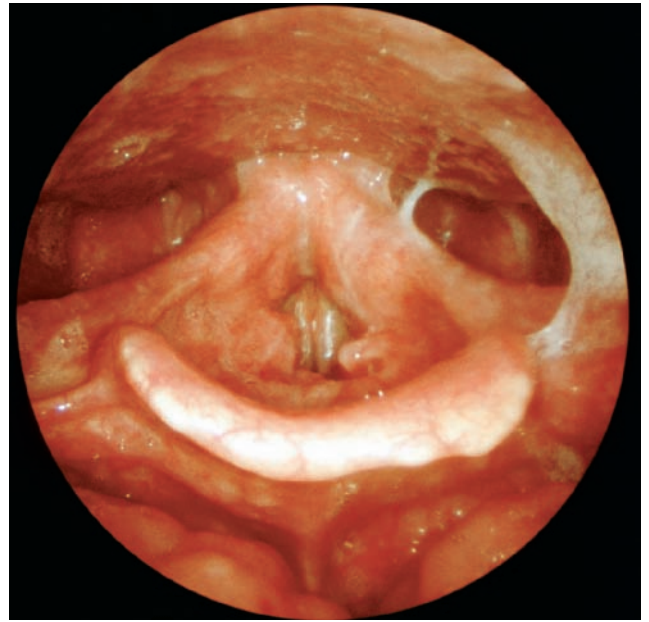
**Laryngeal Cancer**

Squamous cell carcinoma is the most common malignancy of the larynx. Changes in the laryngeal mucosa occur over time as it is subjected to noxious irritants such as cigarette smoke. White, patchy, precancerous lesions known as *leukoplakia* appear. Red, velvety patches, called *erythroplakia*, are thought to represent a later stage of carcinoma development. The initial cancerous lesion, carcinoma *in situ* (CIS), is superficial. Malignant cells replace the lining layer, but do not invade into deeper tissues. Untreated, most CIS lesions develop into squamous cell cancer (ACS, 2005b). Laryngeal cancer spreads by both direct invasion of surrounding tissues and by metastasis.



**Figure 37-6** ■ Laryngoscopy showing a polyp on the left vocal cord.

Source: ISM, Phototake NYC.



**Figure 37-7** ■ Cancer of the larynx and epiglottis.

Source: ISM, Phototake NYC.

It may metastasize to the lungs; however, metastases of other cancers to the larynx are rare.

Laryngeal cancer may develop in any of the three areas of the larynx: the glottis, the supraglottis, and the subglottis. Manifestations vary according to site of the lesion.

Lesions of the true vocal cords or glottis account for nearly 60% of all laryngeal cancers. Fortunately, these cancers tend to be well differentiated and slow growing. Metastasis occurs late in the course of the disease because of a limited lymphatic supply. The usual symptom of glottic cancer is hoarseness, or a change in the voice because the tumor prevents complete closure of the vocal cords during speech.

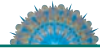
Approximately 35% of laryngeal cancers develop in the supraglottic area, which includes the epiglottis, aryepiglottic folds, arytenoid muscles and cartilage, and false vocal cords (Figure 37-7 ■). Lymphatic supply to this region of the larynx is rich; tumors often invade locally and metastasize early. Symptoms often do not develop until the tumor is relatively large, delaying diagnosis. Manifestations of supraglottic cancer include painful swallowing, sore throat, or a feeling of a lump in the throat. Later manifestations include dyspnea, foul breath, and pain that radiates to the ear.

Subglottic tumors (below the vocal cords) are the least common, accounting for the remaining 5% of laryngeal tumors. They often are asymptomatic until the enlarging tumor obstructs the airway. Common manifestations of laryngeal cancer are listed below.

**MANIFESTATIONS of Laryngeal Cancer**

- |                       |                         |
|-----------------------|-------------------------|
| ■ Hoarseness          | ■ Foul breath           |
| ■ Change in the voice | ■ Palpable lump in neck |
| ■ Painful swallowing  | ■ Earache               |
| ■ Dyspnea             |                         |

## INTERDISCIPLINARY CARE



Benign laryngeal tumors may resolve with correction of the underlying problem, such as voice training with a speech therapist or smoking cessation. Treatment of laryngeal malignancy varies with the extent of the cancer. Early diagnosis and treatment are important: 80% to 95% of early stage tumors can be cured, whereas 50% to 80% of people with advanced laryngeal cancer die of the disease.

### Diagnosis

- *Direct or indirect laryngoscopy* is used for initial evaluation when laryngeal cancer is suspected. A fiberoptic laryngoscope is used for direct laryngoscopy; mirrors are used to visualize the larynx in indirect laryngoscopy.
- *Biopsy* is obtained from suspicious lesions to examine the cells. Biopsy is usually obtained under general anesthesia or conscious sedation. Tissue may be obtained via endoscopy or by fine-needle aspiration of the mass.
- *Imaging studies* such as CT scan, MRI, and chest x-ray are obtained to evaluate the size of the mass, possible extension into deeper tissues, involvement of lymph nodes, and possible metastasis to the lungs. A barium swallow may be done to evaluate the effects of the tumor on swallowing. A PET scan also may be done (possibly in conjunction with CT scan) to detect tumor metastasis.

### Treatments

An inhaled steroid spray may be used for vocal cord polyps. In some cases, surgical excision of benign nodules or polyps is required. This usually is performed via laryngoscopy, using microforceps or a laser. A biopsy of the tumor is done to rule out malignancy.

Laryngeal cancer treatment is determined by *staging* the cancer. Information such as tumor size and location (T), number of involved lymph nodes (N), and presence or absence of metastases (M) is combined to assign a stage, designated by Roman numerals I to IV. Table 37–1 outlines laryngeal cancer stages.

**RADIATION THERAPY** Radiation therapy is often the treatment of choice for early laryngeal cancer. Radiation disrupts the DNA of the cell, causing it to die. External radiation commonly is used; brachytherapy, implants of iridium seeds placed into hollow plas-

tic needles that are inserted directly into or near the tumor site during surgery to deliver radiation, is less frequently used for laryngeal or hypopharyngeal cancer. Radiation therapy is extremely effective for treating glottic cancer, with cure rates equal to those achieved by surgery. Radiation therapy preserves the voice, although the tone or timber of the voice may be affected.

Radiation therapy may be used in combination with chemotherapy (*chemoradiotherapy*) to treat more advanced laryngeal cancers. Nearly two-thirds of clients with locally invasive cancers can avoid total laryngectomy when treated with combination radiation and chemotherapy. Survival rates are equal to those achieved with total laryngectomy (Way & Doherty, 2003).

Radiation therapy also may be used in conjunction with surgery to destroy any remaining cancerous cells, or as a palliative treatment for advanced tumors. See Chapter 14 ∞ for more information about radiation therapy and its nursing implications.

**CHEMOTHERAPY** Chemotherapy is used in combination with radiation therapy as the primary treatment for some laryngeal cancers. It also is used to treat distant metastasis and for palliation when the tumor is unresectable. The most commonly used chemotherapy drugs to treat laryngeal cancer are cisplatin (Platinol) and 5-fluorouracil (5-FU). Other drugs that may be used include methotrexate (Mexate), bleomycin sulfate (Blenoxane), and carboplatin (Paraplatin). A multiple-drug treatment regimen may be employed to maximize therapeutic effects. See Chapter 14 ∞ for the nursing implications for chemotherapy.

### Surgery

The type of surgery used to treat laryngeal cancer is based on site, size, and invasiveness of the tumor into the larynx and surrounding tissues. The goals of surgery are to remove the malignancy, maintain airway patency, and achieve optimal cosmetic appearance.

Carcinoma *in situ*, vocal cord polyps, and early vocal cord cancers may be removed by laser during a laryngoscopy procedure. The cure rate for early tumors using this method is excellent. This surgery may be performed on an outpatient basis. The degree of trauma to the vocal cords varies, depending on the size of the lesion. The voice is preserved, but total voice rest with whispering only may be ordered for a week or more following surgery. In some cases, a temporary tracheostomy may

TABLE 37–1 Staging of Laryngeal Tumors

Stage 0	<ul style="list-style-type: none"> <li>■ Carcinoma <i>in situ</i></li> <li>■ No lymph node involvement or metastasis</li> </ul>
Stage I	<ul style="list-style-type: none"> <li>■ Tumor confined to site of origin with normal vocal cord mobility</li> <li>■ No lymph node involvement or metastasis</li> </ul>
Stage II	<ul style="list-style-type: none"> <li>■ Tumor involves adjacent tissues</li> <li>■ No lymph node involvement or metastasis</li> </ul>
Stage III	<ul style="list-style-type: none"> <li>■ Tumor confined to larynx with fixation of vocal cords; immediately surrounding supraglottic tissues may be involved</li> <li>■ No lymph node involvement or a single positive node on the side of the tumor</li> <li>■ No metastasis</li> </ul>
Stage IV	<ul style="list-style-type: none"> <li>■ Massive tumor that extends beyond boundaries of larynx to involve surrounding tissues</li> <li>■ Single or multiple lymph nodes may be involved</li> <li>■ Distant metastasis may be present</li> </ul>

be done at the time of surgery to ensure that swelling does not interfere with airway patency. Once the tracheostomy tube is removed and the opening is closed, the client can eat, speak, and breathe normally.

**Laryngectomy**, removal of the larynx, may be necessary. A *partial laryngectomy* (hemilaryngectomy, vertical partial laryngectomy) may be used for tumors localized to a portion of the larynx with limited extension beyond the larynx. In a partial laryngectomy, 50% or more of the larynx is removed. The voice generally is well preserved, although it may be changed by the surgery. A tracheostomy tube may be inserted for early postoperative airway management. It is usually removed in 5 to 7 days as postoperative swelling subsides, and the stoma is allowed to close. Normal speaking, breathing, and swallowing are restored. If the epiglottis has been removed, careful monitoring for aspiration is necessary. Enteral tube feedings or parenteral nutrition may be required for several weeks after surgery. Swallowing techniques to prevent aspiration are taught.

A *total laryngectomy* is required for cancers that extend beyond the vocal cords. The entire larynx is removed, along with the epiglottis, thyroid cartilage, several tracheal rings, and the hyoid bone. Because the trachea and the esophagus are permanently separated by this surgery (Figure 37-8 ■), there is no risk of aspiration during swallowing. Normal speech is lost, and a permanent tracheostomy is created. The tracheostomy tube inserted during surgery may be left in place for several

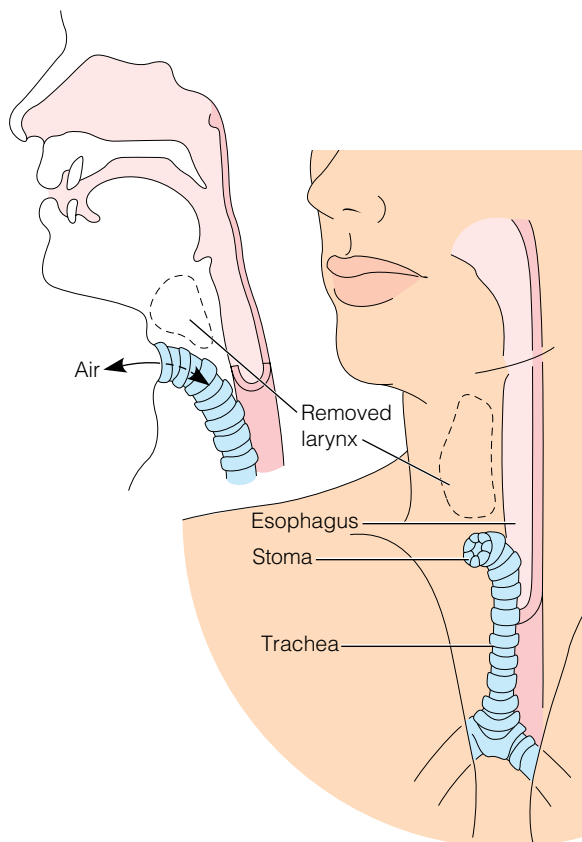
weeks and then removed, leaving a natural stoma, or it may be left in place permanently. See page 1256 for nursing care of the client undergoing a total laryngectomy. Procedure 37-1 on page 1257 outlines tracheostomy care.

If cervical lymph nodes are involved but there is no evidence of distal metastasis, *radical* or *modified neck dissection* may be performed along with total laryngectomy. In a radical neck dissection, all soft tissue from the lower edge of the mandible down to the clavicle is removed, including cervical lymph nodes, the sternocleidomastoid muscle, internal jugular vein, cranial nerve XI (spinal accessory), and submaxillary salivary gland. Extensive tissue dissection can result in significant deformity. Skin grafts or flaps may be used to close the wound. Hemovac drains are placed in the wound to prevent hematoma and extensive edema formation. After surgery, the client may have difficulty lifting and turning the head because of muscle loss. Resection of the spinal accessory nerve causes shoulder drop on the affected side. In a modified neck dissection, neck contents are removed, with the exception of the sternocleidomastoid muscle, internal jugular vein, and spinal accessory nerve.

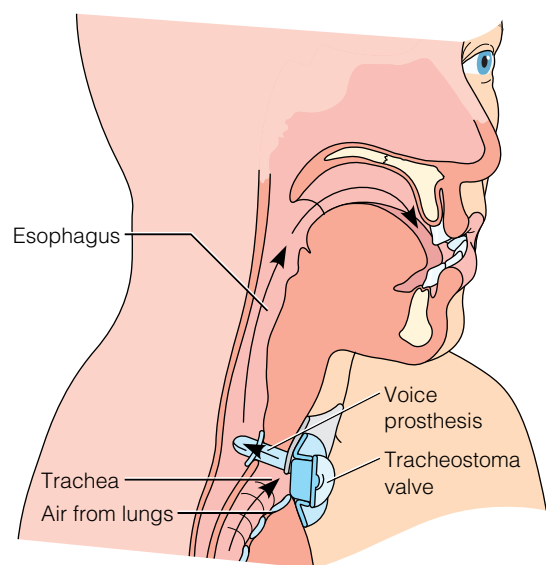
A gastrostomy also may be performed to maintain nutrition in the client with laryngeal or hypopharyngeal cancer. See Chapter 23 ∞ for more information about caring for the client with a gastrostomy tube.

### Speech Rehabilitation

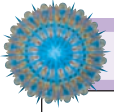
Various techniques may be used to restore speech after total laryngectomy. *Tracheoesophageal puncture (TEP)* is the usual method used to restore speech. A small fistula is created between the posterior tracheal wall and the anterior esophagus. A small, one-way shunt valve is fitted into the fistula (Figure 37-9 ■). Occluding the tracheostomy stoma with a



**Figure 37-8 ■** Following a total laryngectomy, the client has a permanent tracheostomy. No connection between the trachea and esophagus remains.



**Figure 37-9 ■** The tracheoesophageal prosthesis allows diversion of air from the trachea through a one-way valve into the esophagus and oropharynx, producing speech when the tracheostomy stoma is occluded. The one-way valve prevents food from entering the trachea.



## NURSING CARE OF THE CLIENT HAVING A Total Laryngectomy

### PREOPERATIVE CARE

- Provide routine preoperative care and teaching as explained in Chapter 4 ∞.
- Assess knowledge and understanding of the diagnosis and proposed surgery. Clarify information and reinforce previous teaching as needed. *A clear understanding by the client and family of the purpose, anticipated benefits, and consequences of total laryngectomy prior to surgery is vital to promote postoperative recovery.*
- Assess anxiety levels of the client and family related to the diagnosis and proposed surgery. *High levels of anxiety interfere with learning and the ability to cooperate in care. Interventions to reduce anxiety may be required prior to teaching and providing preoperative instructions.*
- Without increasing fear, emphasize that total laryngectomy results in a loss of speech and that the client will breathe through a permanent stoma in the neck. *Although clients and family members may verbalize an understanding of the loss of speech following surgery, they may believe that verbal communication will still be possible through the stoma.*
- Establish a means of communicating postoperatively, using a magic slate, alphabet board, eye or hand signals, or other strategies. *Learning techniques for communicating preoperatively decreases the client's and family's postoperative anxiety. Long-term speech rehabilitation measures, such as the tracheoesophageal puncture, are not appropriate for use in the immediate postoperative period.*
- Point out that surgery will affect the senses of taste and smell and hence eating in the initial postoperative period. Reassure that nutritional and fluid needs will be met with intravenous or enteral feedings until eating can be resumed. *The client may not be prepared for the effect of surgery on taste and smell and, therefore, the enjoyment of food.*
- If possible and desired by the client and family, arrange a visit by a postlaryngectomy client who effectively uses an alternate form of verbal communication. *The client and family may feel more comfortable expressing their fears and asking questions of someone who has gone through the same experience they are facing.*

### POSTOPERATIVE CARE

- Provide routine postoperative nursing care and monitoring as explained in Chapter 4 ∞.

- Frequently monitor airway patency and respiratory status, including respiratory rate and pattern; lung sounds; oxygen saturation. *Excessive or retained respiratory secretions can impair gas exchange, increase the work of breathing, and lead to complications such as pneumonia.*
- Encourage deep breathing and coughing. *Deep breathing helps ensure adequate ventilation of lower airways; coughing helps to move secretions out of airways.*
- Elevate the head of the bed. *The upright position promotes effective ventilation of the lungs, and reduces edema and swelling of the neck.*
- Maintain humidification of inspired gases. *With a tracheostomy, humidification of inspired air in the upper airways is lost. Humidified air helps maintain moist mucous membranes and secretions, promoting secretion removal by coughing or suctioning.*
- Maintain an adequate fluid intake (intravenously, enterally, and orally when allowed). *Adequate hydration keeps secretions liquid and mucous membranes moist.*
- Suction via tracheostomy using sterile technique as needed. *Surgery, impaired nutrition, and the effects of radiation therapy may cause fatigue and a weak cough effort. Suctioning may be necessary to clear secretions and maintain airway patency.*
- Provide tracheostomy care as needed. See Procedure 37–1. *Periodic cleaning of the tracheostomy tube is necessary to remove accumulated secretions and maintain airway patency.*
- Teach to protect the stoma from particulate matter in the air with a gauze square or other stoma protector. *Permanent tracheostomy results in loss of the protective mechanisms of the upper airway that prevent foreign material from entering the lungs.*
- Instruct to support the head when moving in bed. *Additional head support reduces the strain on tissues in the operative area.*
- Place the call light within easy reach at all times; answer the call light promptly. *The client who is unable to speak needs reassurance that help is within reach at all times.*
- Encourage family members to remain present when possible. *Supportive family presence helps reassure the client that he or she will not be left alone or helpless.*
- Spend as much time as possible with the client. When leaving the room, specify the time when you will return. *These measures help establish trust and relieve anxiety.*

finger forces exhaled air through the valve into the esophagus and hypopharynx, creating vibration and sound. The muscles of speech are used to form words. The one-way valve prevents aspiration from the esophagus into the trachea. An external tracheostoma valve may be used to avoid using the hand to occlude the stoma. This device covers the entire tracheal stoma and closes during exhalation, forcing air directly into the voice prosthesis. Not all postlaryngectomy clients are candidates for this device, because its use requires motivation and manual dexterity.

*Esophageal speech* uses swallowed air to create sound and form words as it is expelled in a controlled belch. The pharyn-

goesophageal segment vibrates with the belch, creating sound. Muscles of the mouth and tongue are used to control the sound and form words. This form of speech takes practice, and fluent speech may not be restored.

Several speech generators (electrolarynx) are available. One type is held to the neck and creates vibrations that are transmitted to the neck and into the mouth (Figure 37–10A ■). The transmitted vibrations are formed into words using the normal muscles of speech. Another device delivers a tone into the mouth via a plastic tube inserted into the corner of the mouth (Figure 37–10B ■). The lips, tongue, and mouth muscles are used to form the sound into words.

**PROCEDURE 37-1 PROVIDING TRACHEOSTOMY CARE****GATHER SUPPLIES**

- Tracheostomy cleaning kit
- Sterile suction catheter and glove kit
- Sterile disposable replacement inner cannula, if appropriate
- Cleaning solutions (e.g., hydrogen peroxide and sterile normal saline)
- Sterile 4 × 4 gauze dressings (not cotton-filled) or precut dressing
- Sterile cotton-tipped applicators
- Single-use tracheostomy tube holder or cotton twill ties
- Scissors
- Clean exam gloves

**BEFORE THE PROCEDURE**

Provide for privacy. Explain the procedure. Provide for a means of communication (e.g., eye blinking or raising a finger to indicate distress). If the client's condition permits, provide a pencil and paper or

magic slate for questions. Place in semi-Fowler's or Fowler's position to facilitate lung ventilation. Assess lung sounds; suction the tracheostomy using sterile technique as needed.

**DURING THE PROCEDURE**

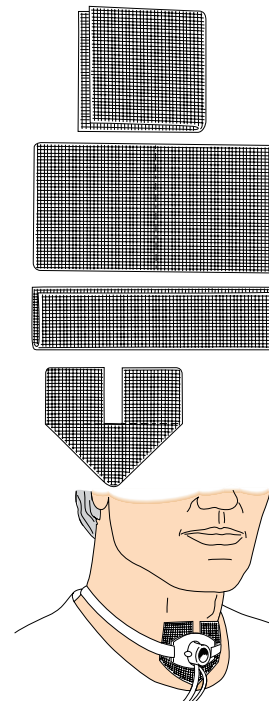
- Use standard precautions.
- Wearing a clean disposable glove, remove the tracheostomy dressing. Dispose of the glove and dressing.
- Open sterile supplies, pouring hydrogen peroxide and normal saline into separate containers. Don sterile gloves.
- Using sterile applicators or gauze dressings moistened with normal saline, clean around the incision, using each applicator or gauze dressing only once. Hydrogen peroxide may be used to remove crusted secretions; thoroughly rinse the area with gauze moistened with normal saline afterward to prevent skin irritation from hydrogen peroxide.
- If the tracheostomy tube has an inner cannula that can be removed for disposal or cleaning, remove the tube and set it aside for disposal or place it in the hydrogen peroxide. Cleanse the flange of the outer cannula in the same manner as the incision.
- Clean reusable inner cannulas using a small brush, pipe cleaners (provided in the tracheostomy care kit), or cotton-tipped applicators.
- Rinse the inner cannula thoroughly in normal saline. Tap it gently against the inner aspect of the sterile bowl to remove excess liquid.
- Suction the outer cannula using sterile technique.
- Replace the inner cannula (using a new disposable cannula or the cleaned cannula) into the tracheostomy tube.
- Replace the dressing, using either a commercially prepared tracheostomy dressing or an opened gauze 4 × 4 refolded into a V shape (see the accompanying figure). Do not cut the dressing or use a cotton-filled dressing to prevent aspiration of foreign material into the respiratory tract.
- Apply a clean tracheostomy holder or clean ties using either the one- or two-strip method.

*One-Strip Method*

- a. Cut a length of twill tape 2.5 times the length needed to go around the client's neck from one tube flange to the other.
- b. Thread one end of the tape through one flange of the tracheostomy tube. Bring the other end around the back of the client's neck, then thread it through the other flange and back around the back of the neck to meet the first end. Tie the loose ends securely using a square knot and allowing one or two fingers' breadth of slack between the tie and the client's neck.

*Two-Strip Method*

- a. Cut a length of twill tape about 1.5 times the distance from flange to flange under the client's neck. Divide this into two unequal pieces (approximately one-third and two-thirds).
  - b. Make a small slit approximately 2 to 3 cm from one end of each piece. Thread the end of the tape with the slit through the flange, then thread the other end of the tape through the slit to secure it. Repeat with the other portion of tape.
  - c. Position the longer tape behind the client's neck and tie the free ends of tape securely, using a square knot and allowing a small amount of slack as before.
- Once the clean ties are secured, remove the old ties.
  - Pad the knot to reduce skin irritation.

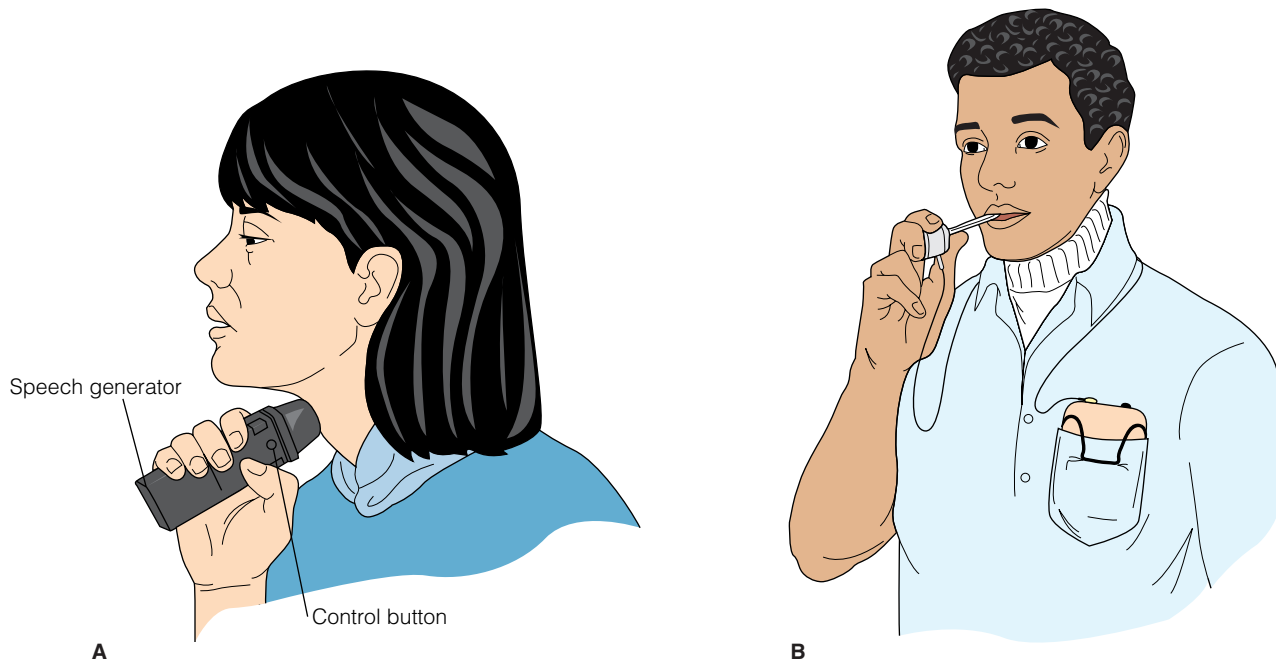


Steps for folding a gauze 4 × 4 into a tracheostomy dressing.

**AFTER THE PROCEDURE**

Assess breathing and tolerance of the procedure. Dispose of supplies and used solutions. Wash hands. Chart the procedure and any ob-

servations made during the procedure such as amount, color, and consistency of sputum and appearance of the incision.



**Figure 37-10** ■ Speech generators. *A*, The client holds the vibrating tip of the speech generator against the throat, using the mouth to form words. *B*, A plastic handpiece of the generator is held in the corner of the mouth. The audible tone produced by the generator is formed into words.



## NURSING CARE

Nurses can be instrumental in early identification and treatment of laryngeal disorders by emphasizing the need for clients with new chronic hoarseness to seek treatment.

### Health Promotion

Health promotion activities to prevent laryngeal cancer focus on preventing smoking among children, adolescents, and young adults, and promoting smoking cessation in people who do smoke. Activities to promote abstinence or moderate alcohol use also are beneficial in reducing a significant risk factor for laryngeal cancer.

### Assessment

Nurses can be instrumental in identifying early signs of laryngeal cancer, facilitating early diagnosis and treatment.

- **Health history:** Current symptoms, including voice change, difficulty swallowing, throat pain; risk factors such as voice abuse, family history of cancer, occupational exposures; smoking history, use of alcohol and amount.
- **Physical examination:** Voice character; general appearance and apparent state of health; swallowing ability; visible or palpable mass in neck.

### Nursing Diagnoses and Interventions

Nursing care for the client with a benign tumor of the larynx focuses on maintaining a patent airway and teaching about the disorder and strategies to prevent its recurrence. The client with laryngeal cancer has multiple nursing care needs. The risk for impaired verbal communication is significant. Dysphagia may

interfere with swallowing and nutrition. Nutrition also may be impaired by radiation, chemotherapy, and surgery. The diagnosis of cancer is frightening for most clients, no matter what the potential for cure is with treatment. See the Nursing Care Plan that follows for additional nursing diagnoses and interventions.

### Risk for Impaired Airway Clearance

Following resection of a benign or malignant vocal cord nodule, local tissue edema may interfere with airway patency.

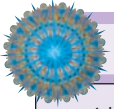
#### PRACTICE ALERT

During the immediate postoperative period, closely monitor for signs of airway obstruction, such as labored breathing or inspiratory stridor. The larynx is the narrowest portion of the upper airways. Tissue edema following surgery can further restrict the airway, interfering with lung ventilation and gas exchange.

- Apply cold packs to the neck as ordered or indicated. *Cold application constricts local blood vessels and reduces edema development.*
- Withhold food and fluids until the cough and gag reflexes have returned. *Local anesthesia used during removal of benign tumors and nodules impairs the cough and gag reflexes, increasing the risk for aspiration.*

### Impaired Verbal Communication

Treatment of laryngeal cancer often alters the quality of the voice, results in short-term restriction of speaking, or, in the case of total laryngectomy, causes loss of the voice. The client ultimately determines treatment choices for laryngeal cancer; some choose to forgo laryngectomy to avoid voice loss when the chance for long-term success and cancer cure is minimal.



## NURSING CARE PLAN A Client with Total Laryngectomy

David Tom is a 61-year-old accountant who is divorced and has two adult children. He has smoked two packs of cigarettes daily since high school, and usually has three or four cocktails each evening. After several months of persistent sore throat and hoarseness, Mr. Tom was diagnosed with cancer of the larynx. He has been admitted to the surgical care unit from the ICU 2 days post total laryngectomy.

### ASSESSMENT

Mr. Tom's vital signs are stable: BP 146/84, P 92 and regular, R 18, T 98°F (36.7°C) axillary. A tracheostomy tube is sutured in place, and he is receiving humidified oxygen at 28% per tracheostomy collar. Pulse oximetry is 94%. He is receiving continuous tube feeding per nasogastric feeding tube. Two Hemovac wound drains are present in the right neck area. A moderate amount of edema is noted in the right facial and submandibular area. Mr. Tom is ambulatory within the room.

### DIAGNOSES

- *Risk for Ineffective Airway Clearance* related to postoperative edema
- *Risk for Ineffective Breathing Pattern* related to pain and anxiety
- *Disturbed Body Image* related to total laryngectomy and presence of tracheostomy stoma
- *Impaired Verbal Communication* related to total laryngectomy
- *Pain* related to surgical procedure
- *Risk for Imbalanced Nutrition: Less than Body Requirements* related to difficulty eating after surgery

### EXPECTED OUTCOMES

- Maintain clear airways and lung sounds.
- Maintain oxygen saturation level greater than 92%.
- Demonstrate interest in providing incision and stoma care.
- Accept information about potential communication strategies.

- Prior to surgery, assess for additional obstacles to communication. *Communication may be impaired by hearing loss, illiteracy, or weakness associated with the disease process, altering the ability to use alternative communication strategies.*
- Assess the importance of verbal communication to self-concept, occupation, and lifestyle. *Many factors influence adaptation to the loss of normal verbal communication. If the ability to speak is central to an occupation (e.g., elementary school teacher, singer) or self-concept (e.g., a politician or attorney), adapting to a total laryngectomy may be difficult. For these clients, laryngectomy may mean a loss of employment or career.*

### PRACTICE ALERT

Prior to surgery, introduce nonverbal communication strategies such as pencil and paper, magic slate, or an alphabet board. Encourage the client to practice using each method and to choose the most acceptable one. Having the client determine a means of communication prior to surgery helps to alleviate anxiety and increases the sense of control.

- Communicate effective pain management.
- Maintain appropriate body weight, intake, and output.

### PLANNING AND IMPLEMENTATION

- Assess respiratory status including rate, pattern, lung sounds, and cough effectiveness at least every 4 hours.
- Monitor quantity, color, and odor of secretions.
- Assess vital signs and pain at least every 4 hours. Administer analgesics as ordered.
- Schedule time to sit with Mr. Tom and discuss his concerns and feelings at least three times per day.
- Provide written information as requested.
- Monitor intake, output, and daily weight.
- Arrange dietary consultation to determine caloric requirements.

### EVALUATION

Mr. Tom reports in writing that his pain is adequately controlled. His respiratory status is stable with clear breath sounds throughout and an oxygen saturation of 94%. He is afebrile. Mr. Tom is tolerating tube feedings well and expresses a desire to begin eating. The dietitian has visited and assisted in planning to begin oral feedings. Intake and output are stable, as is his weight. Mr. Tom has been receptive to receiving information about follow-up care and exploration of various modalities of speech.

### CRITICAL THINKING IN THE NURSING PROCESS

1. Compare and contrast advantages and disadvantages of various methods to allow speech following total laryngectomy.
2. Develop a plan of care for Mr. Tom for the nursing diagnosis *Disturbed Body Image*.
3. Discuss nursing interventions to provide wound care for the client with laryngectomy and radical neck dissection.
4. List strategies to optimize ventilation.

*See Evaluating Your Response in Appendix C.*

- Arrange consultation with a speech therapist about alternate forms of oral communication prior to surgery if possible. *Determining a means of communicating on a continuing basis prior to surgery helps to relieve fear of inability to communicate and may guide the choice of a surgical procedure.*

### PRACTICE ALERT

After surgery, assess frequently. Place the call bell at hand. The presence of a caring nurse helps to decrease anxiety and promotes communication. Knowing that help is readily available enhances feelings of security and decreases anxiety.

- Reinforce teaching about alternative communication strategies. *Anxiety or information overload may impair the ability to retain information; reinforcement facilitates learning.*
- Maintain a positive attitude about postoperative communication, but do not promote unrealistic expectations. *Not all clients are able to use all alternative methods of verbal communication after the laryngectomy. Some clients remain nonverbal.*



- If desired, arrange a visit by a rehabilitated laryngectomy client who has mastered an alternative form of verbal communication and has a positive attitude about rehabilitation. *Many clients and their families find that they are better able to communicate their fears with someone who has gone through the same experience they are facing.*

See the accompanying nursing research box for more information about assistive devices for use in the early postoperative period.

### Impaired Swallowing

Disruption of laryngeal structures by the tumor itself or due to radiation or surgery can impair the swallowing mechanism. Additionally, even when a total laryngectomy has been performed and a connection between the oropharynx and trachea no longer exists, swallowing may cause fear of choking.

- Maintain intravenous fluids and enteral feedings or parenteral nutrition until adequate food and fluids can be ingested orally. *It is important to maintain nutritional and fluid balance until normal eating can be resumed.*
- Postoperatively, initiate oral intake with soft foods, not liquids. *Soft foods are easier to handle and swallow initially. As recovery progresses, thickened liquids can be swallowed and, eventually, a normal diet can be resumed.*
- Following total laryngectomy, reassure that choking is not possible, because there is no connection between the esophagus and trachea. *Clients often fear that swallowing will result in choking and they will be unable to cough effectively.*
- Instruct to initiate a swallow by placing a small amount of food on the back of the tongue, flex the head forward, and then think “swallow.” *Swallowing is no longer an automatic function and needs to be relearned.*

### PRACTICE ALERT

Provide for privacy during initial attempts at eating. Eating in the presence of others may cause embarrassment until confidence in eating is regained. Privacy also reduces distractions, allowing concentration on swallowing.

### Imbalanced Nutrition: Less than Body Requirements

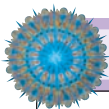
Large laryngeal tumors often place pressure on the esophagus and may cause dysphagia (difficulty swallowing) or odynophagia (painful swallowing). In either case, difficulty eating may ultimately impair nutrition. Additionally, cancer often produces a hypermetabolic state, increasing calorie requirements. If surgery is performed, difficulty swallowing and a fear of aspiration in the early postoperative period also interfere with eating. Enteral or parenteral feedings are usually needed initially to meet nutritional status. After a total laryngectomy, the senses of taste and smell are disrupted. Although the sense of taste may be partially recovered, clients may complain that eating no longer is pleasurable.

- Assess nutritional status using height and weight charts, reported weight loss, and anthropometric measurements such as skin folds. *Thorough assessment of nutritional status is important in planning to meet current and anticipated calorie needs.*

### PRACTICE ALERT

Monitor food and fluid intake and urinary output. Pain or fatigue, rather than a sensation of fullness, may prompt the decision to stop eating, resulting in inadequate intake.

- Evaluate current and preferred eating habits and foods, as well as understanding of nutrition. *This evaluation provides additional information about nutrition as well as a basis for future planning.*



## NURSING RESEARCH Evidence-Based Practice: The Client Undergoing Laryngectomy

Communication methods and content among clients who had undergone surgery for head or neck cancer were evaluated in this pilot study of the use of electronic speech-generating devices (SGDs) (Happ et al., 2005). The researchers also looked at the quality (ease and client satisfaction) of communications among study participants, as well as barriers to SGD use and the effect of client factors such as age and illness severity on communications. All study participants were alert and able to write legibly; the majority had at least some experience using a computer.

Although 60% of study participants were found to be able to use SGDs with minimal assistance and instruction, the devices were used in only 17% of observed communications; writing and nonverbal communications were used the majority of the time. Barriers to use of the devices included placement of the device out of the client's reach, mechanical malfunctions, and impatience of caregivers with the time required for typed communications. Clients expressed frustration with the lack of a standard keyboard and with the impersonality of the computerized voice. Overall, the devices were found to be useful as one of several methods of communication used by the client.

### IMPLICATIONS FOR NURSING

Speech-generating devices can facilitate communication for selected clients, particularly when the content of the message is complex. Training of clients, caregivers, and family members is necessary for effective use of these devices, however. Preoperatively, clients scheduled for laryngectomy should be instructed in communication methods to use after surgery, including use of gestures, written messages (including predeveloped messages, such as “I am in pain”), and use of any assistive communication devices.

### CRITICAL THINKING IN CLIENT CARE

1. In this study, SGDs often were found out of the client's reach. What planning should the nurse do to help ensure that assistive communication devices are accessible to the client?
2. Clients in this study were literate and many had at least some experience using computers. Do you think results of the study would differ if the study population had less education, was illiterate, or had minimal English language proficiency? Why or why not?
3. Develop a teaching plan for a preoperative laryngectomy client using the nursing diagnosis *Deficient Knowledge: Postoperative Communication Strategies*.

**PRACTICE ALERT**

Weigh daily. Daily weight is an accurate measure of both fluid balance and nutritional status.

- Refer to a dietitian for further evaluation, planning, and education. *A professional can identify nutritional needs and help plan a diet that will meet them.*
- Encourage experimentation with foods of different textures and temperatures. *Very cold foods or foods of a soft texture may be easier to swallow.*
- Encourage frequent, small meals rather than three large meals per day. *Frequent, small quantities of food improve overall intake when dysphagia, odynophagia, or fatigue interfere with nutrition.*
- Recommend liquid supplements such as Ensure when calorie needs are not being met. Provide information about where to obtain nutritional supplements. *Liquid dietary supplements provide balanced nutrition as well as additional calories and are an effective way of increasing intake. They are available without prescription in major supermarkets.*
- Provide mouth care before meals and supplemental feedings. Provide a topical anesthetic such as viscous lidocaine before eating for stomatitis or esophagitis related to radiation or chemotherapy. *The tumor or its treatment may cause bad breath or a foul taste in the mouth, which suppresses appetite. Inflamed mucosa may make eating uncomfortable. A topical anesthetic may relieve this discomfort and thus promote food intake.*
- Provide an antiemetic 30 minutes before eating as needed to relieve nausea. *Nausea interferes with food intake. An antiemetic can relieve nausea and make eating possible.*
- Suggest enteral (tube) feedings via nasogastric or gastrostomy tube if the client is unable to consume enough food to maintain weight and nutritional status. *Both cancer and surgery increase calorie needs. Supplemental enteral feedings may be necessary to prevent catabolism and to promote healing and recovery.*

**PRACTICE ALERT**

Following laryngectomy, place in semi-Fowler's or Fowler's position. Elevating the head of the bed facilitates swallowing of oral secretions and helps prevent regurgitation of tube feedings.

- Instruct to perform mouth rinses before initiating feeding postoperatively. *Rinsing helps clean the mouth and also provides practice in using tongue and cheek muscles to control fluid in the mouth.*
- Refer to a physical or speech therapist for swallowing rehabilitation following laryngectomy. *Because surgery changes the relationship of the trachea, esophagus, and oropharynx, swallowing needs to be relearned before eating.*
- Reinforce swallowing instructions. *Reinforcement promotes learning.*

**Anticipatory Grieving**

The client with laryngeal cancer faces not only the diagnosis of cancer, which is often perceived as a death sentence, but also the prospect of mutilating surgery. If laryngectomy is necessary, the client grieves the loss of both a body part and an important function, speech, a vital aspect of social interaction and

often necessary for one's career. It also enables people to express their needs when they cannot meet them alone. The loss of speech, therefore, is a major loss. In addition, the tracheal stoma changes the manner in which the client breathes. If radical neck dissection is required, loss of neck musculature and function also alters body image and self-concept.

- Provide opportunities for expressing feelings of grief, anger, or fear about the diagnosis of cancer, the impending surgery, and the anticipated loss of speech. *The client with laryngeal cancer needs the opportunity (and may need permission) to grieve anticipated losses. A cancer diagnosis may precipitate grieving for unfulfilled plans and expectations, even though a cure may be anticipated. Laryngectomy causes a major change in body image, with loss of a vital body part and creation of a stoma. The client also grieves the loss of speech. This loss can have a significant impact on occupation and social interaction.*

**PRACTICE ALERT**

Provide a calm, supportive environment with adequate privacy and emotional support for the client and family members as they work through the grieving process. It is important for the client and family to know that their feelings of loss are real and accepted by caregivers.

- Help the client and family discuss the potential impact of the loss on family structure and function. *Discussion helps family members understand each other's feelings and support one another.*
- Refer for psychological or spiritual counseling as appropriate. *Counseling and spiritual guidance can help the client and family deal with the diagnosis and proposed treatment, and help prevent a sense of defeat and hopelessness.*
- Help identify additional resources, such as coping strategies that have been successfully used in the past to deal with crises. *This exercise helps the client and family identify strengths they can use to deal with the present situation.*

**Using NANDA, NIC, and NOC**

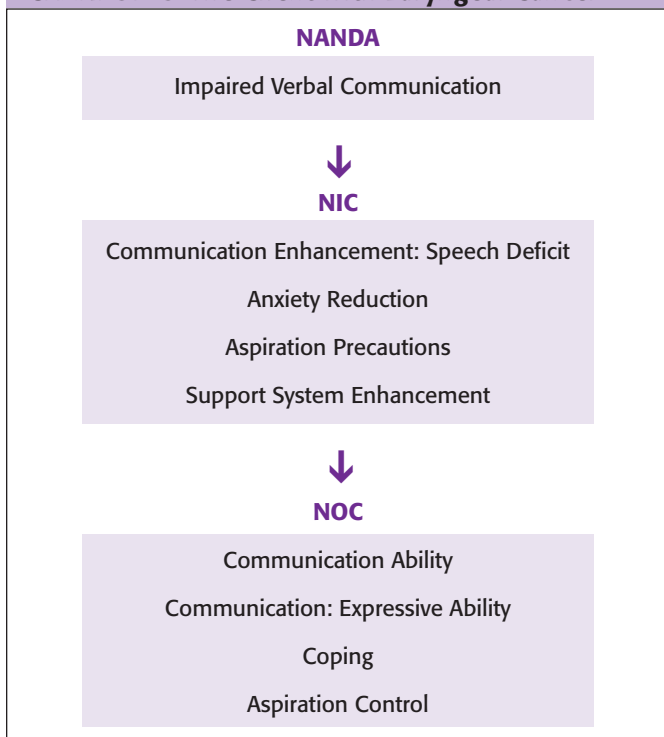
Chart 37-3 shows links between NANDA nursing diagnoses, NIC, and NOC for the client with laryngeal cancer.

**Community-Based Care**

Teaching for the client with a benign laryngeal tumor emphasizes management of contributing factors. Stress the importance of not yelling or screaming. Refer clients, particularly singers, to a speech therapist for voice training. Emphasize the need to keep the voice within its normal range to reduce vocal cord stress. Encourage smoking cessation, particularly if the client is also a singer. Discuss the relationship of industrial pollutants to laryngeal tumors and help explore ways of reducing pollutant exposure.

Teaching the client and family about laryngeal cancer, treatment options, and home care related to those treatments is an important nursing responsibility. Include the following topics when teaching:

- Clarification of treatment options, including risks and benefits.
- Importance of early intervention to reduce the risk of local spread and metastasis.

**NANDA, NIC, AND NOC LINKAGES**  
**CHART 37–3 The Client with Laryngeal Cancer**


Data from *NANDA's Nursing Diagnoses: Definitions & Classification 2005–2006* by NANDA International (2005), Philadelphia; *Nursing Interventions Classification (NIC)* (4th ed.) by J. M. Dochterman & G. M. Bulechek (2004), St. Louis, MO: Mosby; and *Nursing Outcomes Classification (NOC)* (3rd ed.) by S. Moorhead, M. Johnson, and M. Maas (2004), St. Louis, MO: Mosby.

- If a total laryngectomy is proposed, options for communication after surgery, including the pros and cons of each:
  - a. The tracheoesophageal puncture device requires some manual dexterity to manipulate.
  - b. Only about 30% of clients are able to master esophageal speech.

- c. A trial of the speech generator prior to surgery may reduce frustration in learning to use it postoperatively.
- Care related to radiation therapy, including skin and mouth care, management of secretions (see Chapter 14 ∞ for more information about radiation therapy and its effects).
  - Strategies and resources for smoking cessation and alcohol abstinence.
  - Ways to achieve and maintain optimal nutrition.
  - Tracheostomy stoma care and preventing respiratory infection. Provide opportunities to practice and redemonstrate techniques. Clean technique (rather than sterile) is used; the tracheostomy tube may not be needed once the stoma is fully healed. Discuss these additional measures:
    - a. Using a humidifier or vaporizer to add humidity to inspired air.
    - b. Increasing fluid intake to maintain mucosal moisture and loosen secretions.
    - c. Shielding the stoma with a stoma guard, such as a gauze square on a tie around the neck, to prevent particulate matter from entering the lower respiratory tract.
    - d. Promptly removing secretions from skin surrounding the stoma to prevent irritation and skin breakdown.
    - e. Water sports are contraindicated with a permanent tracheostomy; there is no restriction on other activities although lifting may be more difficult because of inability to hold the breath (the Valsalva maneuver).
    - f. Showering and bathing (without submerging the neck or head) are allowed; protect the stoma with a cupped hand or washcloth.
  - Manifestations of potential complications of laryngectomy to be reported to the physician, including loss of hearing or facial expression due to auditory or facial nerve injury, or shoulder drop due to damage to the spinal accessory nerve.
- The client and family need emotional and motivational support through this trying time. Refer to local support groups such as a laryngectomy club or lost cord club. If the client and family are having difficulty adjusting to the diagnosis of cancer and the effects of treatment, provide referral to counseling.

## EXPLORE MEDIA LINK

### Prentice Hall Nursing MediaLink DVD-ROM



Audio Glossary  
NCLEX-RN® Review

### COMPANION WEBSITE [www.prenhall.com/lemone](http://www.prenhall.com/lemone)



Audio Glossary  
NCLEX-RN® Review  
Care Plan Activity: Epistaxis  
Case Study: Sleep Apnea  
MediaLink Applications  
*Laryngectomy*  
*Pulse Oximetry*  
Links to Resources



## CHAPTER HIGHLIGHTS

- Upper respiratory infections (the common cold) are caused by a multitude of different viruses. Most are mild, self-limiting infections, appropriate for self-care; some viruses, however, such as RSV can cause serious lower respiratory illness in the very young or very old.
- Three different strains of influenza virus are identified; type A causes most outbreaks of influenza. Because this disease increases the risk of pneumonia in older adults, people with chronic diseases, and people who are immunocompromised, annual immunization is important for these populations and their caregivers.
- Influenza is differentiated from URI primarily by the presence of systemic manifestations, the duration and degree of fever, and the presence of persistent cough.
- Pharyngitis (sore throat) may be either viral or bacterial in origin; manifestations are similar. Clients with persistent or severe symptoms that include fever, enlarged lymph nodes, and myalgias should be evaluated to rule out streptococcal pharyngitis, which can have significant complications such as rheumatic fever or post-streptococcal glomerulonephritis.
- The incidence of pertussis, a highly contagious reportable disease, is increasing due to waning immunity and improved identification of the infection among adults. In adults, it is often recognized by prolonged and persistent coughing spells. Pertussis is treated in community settings with antibiotic therapy (usually erythromycin or TMP-SMZ).
- Epistaxis (nosebleed) and nasal fracture are relatively common, and pose a risk only when airway clearance is impaired. Emergency care for epistaxis includes pinching the nares or bridge of the nose, sitting upright and leaning forward, and applying ice to the nose. When nasal packing is required to control bleeding, close monitoring of respiratory status (respiratory rate and effort, oxygen saturation) is critical.
- Persistent voice hoarseness is the primary manifestation of laryngeal cancer. When identified and treated early, the rate of cure for laryngeal cancer is high. Some laryngeal tumors, however, have few manifestations until advanced. They may be treated by radiation therapy, chemotherapy, or surgery (laryngectomy and neck dissection).
- Following total laryngectomy, a permanent tracheostomy is created and the upper trachea and esophagus are separated, preventing aspiration when feedings are resumed. A tracheoesophageal puncture may be created to allow verbal communication following total laryngectomy.

## TEST YOURSELF NCLEX-RN® REVIEW

- 1 A client with hypertension asks the nurse what he can do to relieve the symptoms of an acute URI. The nurse recommends that he
  1. ask his physician for an antibiotic prescription.
  2. use an over-the-counter decongestant such as pseudoephedrine to relieve symptoms.
  3. take 1000 mg of vitamin C and use zinc lozenges on a regular basis.
  4. use an over-the-counter nasal spray for no more than 3 days to relieve congestion.
- 2 Which of the following health promotion activities planned by a nurse working with a group of community-dwelling senior citizens would be most likely to prevent influenza and pneumonia?
  1. indoor exercise programs during winter months
  2. influenza vaccine clinics at the senior center
  3. teaching effective hand washing
  4. advising seniors to avoid crowds
- 3 In teaching a client with bacterial sinusitis about home care, the nurse stresses the importance of
  1. completing the antibiotic prescription as ordered.
  2. sleeping with the head of the bed elevated to 45 degrees.
  3. using a humidifier to promote sinus drainage.
  4. maintaining a liberal fluid intake to help liquefy secretions.
- 4 Which of the following nursing interventions for the client with posterior nasal packing is of highest priority?
  1. Elevate the head of the bed.
  2. Apply cold compresses to the nose.
  3. Maintain oxygen therapy.
  4. Provide frequent oral hygiene.
- 5 A client in the emergency department following facial trauma complains that his nose “just keeps dripping.” The drainage appears like watery blood. The most appropriate nursing action would be to:
  1. provide a box of tissues.
  2. reassure the client that this is expected with a nasal fracture.
  3. suction the nasopharynx.
  4. obtain a specimen for glucose testing.
- 6 Expected findings in a client with obstructive sleep apnea would include: (Select all that apply.)
  1. confusion and signs of dementia.
  2. enlarged tongue.
  3. complaints of daytime sleepiness.
  4. decreased oxygen saturation levels while awake.
  5. elevated blood pressure.
  6. complaints of morning headache.
- 7 The nurse in a physician’s office notes that a regular client’s voice is hoarse, a change from previous visits. The most appropriate question to ask the client would be:
  1. “How long has your voice been hoarse?”
  2. “Do you smoke?”
  3. “Do you have a sore throat?”
  4. “Would you like a prescription for throat lozenges?”
- 8 The nurse evaluates his teaching as effective when a client with stage I laryngeal cancer states:
  1. “I’m glad I don’t have to worry about treating this cancer now because it is so early.”
  2. “I hate to think about eventually losing the ability to speak, but I’d rather treat it aggressively than lose my life to cancer.”
  3. “I’m glad this was diagnosed early, when it can be treated with radiation so I won’t lose my voice.”
  4. “Thank goodness this type of cancer usually doesn’t spread anywhere else.”

- 9 Place the following nursing interventions for the client who has undergone total laryngectomy and radical neck dissection in order of priority.
1. Arrange consultation with speech therapist.
  2. Provide small, frequent meals.
  3. Encourage to express feelings regarding loss of voice.
  4. Suction via tracheostomy as needed.
  5. Instruct to support head when moving.

- 10 When providing tracheostomy care, the nurse
1. cuts the dressing using sterile scissors.
  2. secures clean ties before removing soiled ones.
  3. uses clean technique to cleanse the outer cannula.
  4. cleanses the incision with an iodine-based antiseptic.

See Test Yourself answers in Appendix C.

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