chapter 22

Management of Patients With Upper Respiratory Tract Disorders

LEARNING OBJECTIVES

On completion of this chapter, the learner will be able to:

1. Describe nursing management of patients with upper airway disorders.
2. Compare and contrast the upper respiratory tract infections with regard to cause, incidence, clinical manifestations, management, and the significance of preventive health care.
3. Use the nursing process as a framework for care of patients with upper airway infection.
4. Describe nursing management of the patient with epistaxis.
5. Use the nursing process as a framework for care of patients undergoing laryngectomy.

GLOSSARY

alaryngeal communication: alternative modes of speaking that do not involve the normal larynx; used by patients whose larynx has been surgically removed
aphonia: impaired ability to use one's voice due to disease or injury to the larynx
apnea: cessation of breathing
carcinogen: agent that can cause cancer; carcinogens can be chemicals, viruses, hormones, ionizing radiation, or solid materials
dysphagia: difficulties in swallowing
epistaxis: hemorrhage from the nose due to rupture of tiny, distended vessels in the mucous membrane of any area of the nose
herpes simplex: cold sore (cutaneous viral infection with painful vesicles and erosions on the tongue, palate, gingiva, buccal membranes, or lips)
laryngectomy: surgical removal of all or part of the larynx and surrounding structures
laryngitis: inflammation of the larynx; may be caused by voice abuse, exposure to irritants, or infectious organisms
medicamentosa: rebound nasal congestion commonly associated with overuse of over-the-counter nasal decongestants
nuchal rigidity: stiffness of the neck or inability to bend the neck
pharyngitis: inflammation of the throat; usually viral or bacterial in origin
rhinitis: inflammation of the mucous membranes of the nose; may be infectious, allergic, or inflammatory in origin
rhinorrhea: drainage of a large amount of fluid from the nose
rhinosinusitis: inflammation of the nares and paranasal sinuses, including frontal, ethmoid, maxillary, and sphenoid sinuses; replaces the term "sinusitis"
tonsillitis: inflammation of the tonsils, usually due to an acute infection
xerostomia: dryness of the mouth from a variety of causes

Upper respiratory tract disorders are those that involve the nose, paranasal sinuses, pharynx, larynx, trachea, or bronchi. Many of these conditions are relatively minor, and their effects are limited to mild and temporary discomfort and inconvenience for the patient. However, others are acute, severe, and life-threatening and may require permanent alterations in breathing and speaking. Therefore, the nurse must have expert assessment skills, an understanding of the wide variety of disorders that may affect the upper airway, and an awareness of the impact of these alterations on patients. Because many of these disorders are treated outside the hospital or at home by patients themselves, patient teaching is an important aspect of nursing care. When caring for patients with acute, life-threatening disorders, the nurse needs highly developed assessment and clinical management skills, along with a focus on rehabilitation needs.

UPPER AIRWAY INFECTIONS

Upper airway infections are the most common cause of illness and affect most people on occasion. Some infections are acute, with symptoms that last several days; others are chronic, with symptoms that last a long time or recur. Patients with these conditions seldom require hospitalization. However, nurses working in community settings or long-term care facilities may encounter patients who have these infections. Therefore, it is important for the nurse to recognize the signs and symptoms and to provide appropriate care.

Infections of the upper airway are also known as upper respiratory tract infections (URIs); the common cold is the most frequently occurring example. URIs occur when micro-organisms such as viruses and bacteria are inhaled. There are many causative organisms, and people are susceptible throughout life. URIs are the most common reason for seeking health care and for absences from school and work.

URIs affect the nasal cavity; ethmoidal air cells; and frontal, maxillary, and sphenoid sinuses; as well as the pharynx, larynx, and trachea. About 90% of upper respiratory disorders stem from a viral infection of the upper respiratory passages and subsequent mucous membrane inflammation. On average, adults typically develop two to four URIs per year because of the wide variety of respiratory viruses that circulate in the community. Although patients are rarely hospitalized for treatment of URIs, the nurse can influence patient outcomes in community settings and in long-term facilities through patient teaching. Special considerations with regard to URIs in the elderly are summarized in Chart 22-1.

CHART 22-1 Upper Respiratory Tract Disorders in the Elderly

- Upper respiratory infections in the elderly may have more serious consequences if patients have concurrent medical problems that compromise their respiratory or immune status.
- Influenza causes exacerbations of chronic obstructive pulmonary disease (COPD) and reduced pulmonary function.
- Antihistamines to treat upper respiratory disorders must be used cautiously in the elderly because of their side effects and potential interactions with other medications.
- Rhinosinusitis in the elderly is often preceded by nasal packing for treatment of epistaxis.
- As the population ages, it is likely that the number of patients with chronic rhinosinusitis (CRS) and the need for endoscopic sinus surgery will increase. Older patients with CRS present with symptoms similar to those of younger adults and experience a similar degree of improvement and quality of life after endoscopic sinus surgery (Reh, Mace, Robinson, et al., 2007).
- Laryngitis in the elderly is common and most frequently occurs secondary to gastroesophageal reflux disease (GERD). The elderly are more likely to have impaired esophageal peristalsis and a weaker esophageal sphincter. Treatment measures include sleeping with the head of the bed elevated and the use of medications such as H_2-receptor blockers (eg, famotidine [Pepcid], ranitidine [Zantac]) or proton pump inhibitors (omeprazole [Prilosec]).

Rhinitis

Rhinitis is a group of disorders characterized by inflammation and irritation of the mucous membranes of the nose. These conditions can have a significant impact on quality of life and contribute to sinus, ear, and sleep problems and learning disorders. Rhinitis often coexists with other respiratory disorders, such as asthma (Nihlén, Greiff, Montnémery, et al., 2006). It affects more than 50 million people in the United States annually.

Rhinitis may be acute or chronic, nonallergic or allergic. Allergic rhinitis is further classified as seasonal or perennial rhinitis and is commonly associated with exposure to airborne particles such as dust, dander, or plant pollens in people who are allergic to these substances. Seasonal rhinitis occurs during pollen seasons, and perennial rhinitis occurs throughout the year. Allergic disorders, including allergic rhinitis, are described in detail in Chapter 53.

Pathophysiology

Rhinitis may be caused by a variety of factors, including changes in temperature or humidity; odors; infection; age; systemic disease; use of over-the-counter (OTC) and prescribed nasal decongestants; and the presence of a foreign body. Allergic rhinitis may occur with exposure to allergens such as foods (eg, peanuts, walnuts, brazil nuts, wheat, shellfish, soy, cow's milk, and eggs), medications (eg, penicillin, sulfa medications, aspirin, and others with the potential to produce an allergic reaction), and particles in the indoor and outdoor environment (Chart 22-2). The most common cause of nonallergic rhinitis is the common cold. Drug-induced rhinitis may occur with antihypertensive agents, such as angiotensin-converting enzyme (ACE) inhibitors and beta-blockers; "statins," such as atorvastatin (Lipitor) and simvastatin (Zocor); antidepressants; aspirin; and some antianxiety medications. Other causes of rhinitis are identified in Table 22-1. Figure 22-1 shows the pathologic processes involved in rhinitis and rhinosinusitis.

Clinical Manifestations

The signs and symptoms of rhinitis include **rhinorrhea** (excessive nasal drainage, runny nose); nasal congestion; nasal discharge (purulent with bacterial rhinitis); sneezing; and

Chart 22-2 • *Examples of Common Indoor and Outdoor Allergens*

Common Indoor Allergens

- Dust mite feces
- Dog dander
- Cat dander
- Cockroach droppings
- Molds

Common Outdoor Allergens

- Trees (eg, oak, elm, western red cedar, ash, birch, sycamore, maple, walnut, cypress)
- Weeds (eg, ragweed, tumbleweed, sagebrush, pigweed, cockleweed, Russian thistle)
- Grasses (eg, timothy, orchard, sweet vernal, bermuda, sour dock, redtop, bluegrass)
- Molds (*Alternaria, Cladosporium, Aspergillus*)

pruritus of the nose, roof of the mouth, throat, eyes, and ears. Headache may occur, particularly if rhinosinusitis is also present. Nonallergic rhinitis can occur throughout the year.

Medical Management

The management of rhinitis depends on the cause, which may be identified through the history and physical examination. The nurse asks the patient about recent symptoms as well as possible exposure to allergens in the home, environment, or workplace. If viral rhinitis is the cause, medications may be prescribed to relieve the symptoms. In allergic rhinitis, allergy tests may be performed to identify possible allergens. Depending on the severity of the allergy, desensitizing immunizations and corticosteroids may be required (see Chapter 53 for more details). If symptoms suggest a bacterial infection, an antimicrobial agent is used (see later discussion of rhinosinusitis). Patients with nasal septal deformities or nasal polyps may be referred to an ear, nose, and throat specialist.

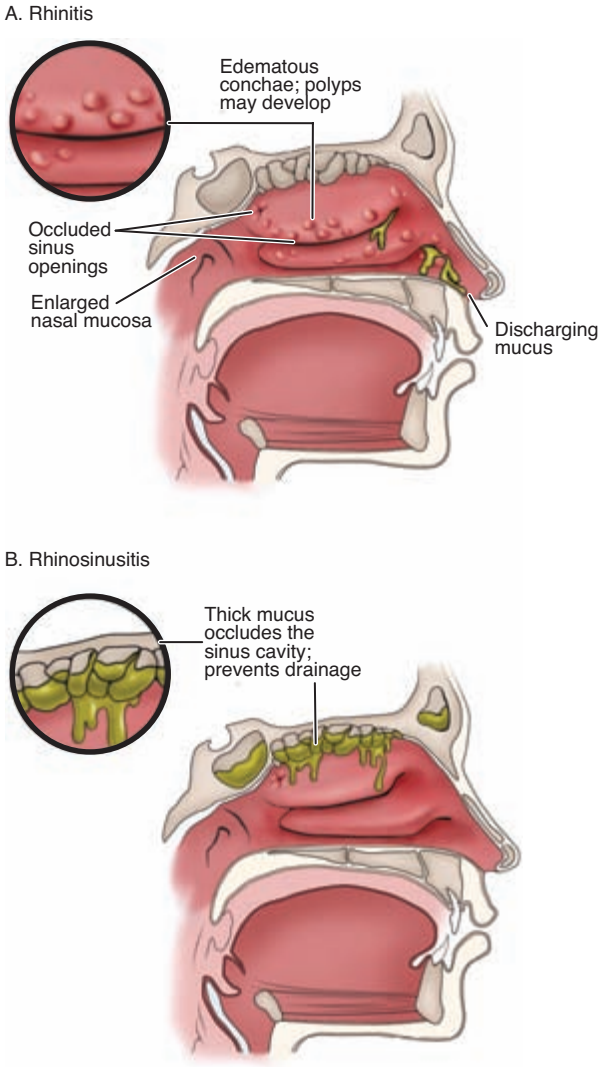

Figure 22-1 Pathophysiologic processes in rhinitis and rhinosinusitis. Although pathophysiologic processes are similar in rhinitis and rhinosinusitis, they affect different structures. **A,** In rhinitis, the mucous membranes lining the nasal passages become inflamed, congested, and edematous. The swollen nasal conchae block the sinus openings, and mucus is discharged from the nostrils. **B,** Rhinosinusitis is also marked by inflammation and congestion, with thickened mucous secretions filling the sinus cavities and occluding the openings.

Table 22-1 CAUSES OF RHINOSINUSITIS

Category	Causes
Vasomotor	Idiopathic Abuse of nasal decongestants (rhinitis medicamentosa) Psychological stimulation (anger, sexual arousal) Irritants (smoke, air pollution, exhaust fumes, cocaine)
Mechanical	Tumor Deviated septum Crusting Hypertrophied turbinates Foreign body Cerebrospinal fluid leak
Chronic inflammatory	Polyps (in cystic fibrosis) Sarcoidosis Wegener's granulomatosis Midline granuloma
Infectious	Acute viral infection Acute or chronic rhinosinusitis Rare nasal infections (syphilis, tuberculosis)
Hormonal	Pregnancy Use of oral contraceptives Hypothyroidism

Adapted from Carr, M. M. Differential diagnosis of rhinitis. Available at: http://icarus.med.utoronto.ca/carr/manual/ddxrhinitis.html

Pharmacologic Therapy

Medication therapy for allergic and nonallergic rhinitis focuses on symptom relief. Antihistamines and corticosteroid nasal sprays may be useful. Antihistamines remain the most common treatment and are administered for sneezing, pruritus, and rhinorrhea. Examples of commonly prescribed antihistamines are discussed in more detail in Chapter 53. Brompheniramine/pseudoephedrine (Dimetapp) is an

example of combination antihistamine/decongestant medications. Cromolyn (NasalCrom), a mast cell stabilizer that inhibits the release of histamine and other chemicals, is also used in the treatment of rhinitis. Oral decongestant agents may be used for nasal obstruction. Use of saline nasal spray can act as a mild decongestant and can liquefy mucus to prevent crusting. Two inhalations of intranasal ipratropium (Atrovent) can be administered in each nostril two to three times per day for symptomatic relief of rhinorrhea. In addition, intranasal corticosteroids may be used for severe congestion, and ophthalmic agents (cromolyn ophthalmic solution 4%) may be used to relieve irritation, itching, and redness of the eyes. Newer allergy treatments include leukotriene modifiers (eg, montelukast [Singulair], zafirlukast [Accolate], zileuton [Zyflo]), immunoglobulin E modifiers (Xolair), and immunomodulatory medications, which are all part of the revised asthma treatment guidelines and are discussed further in Chapter 24. The choice of medications depends on the symptoms, adverse reactions, adherence factors, risk of drug interactions, and cost to the patient.

Nursing Management

Teaching Patients Self-Care

The nurse instructs the patient with allergic rhinitis to avoid or reduce exposure to allergens and irritants, such as dusts, molds, animals, fumes, odors, powders, sprays, and tobacco smoke. Patient education is essential when assisting the patient in the use of all medications. To prevent possible drug interactions, the patient is cautioned to read drug labels before taking any OTC medication.

The nurse instructs the patient about the importance of controlling the environment at home and at work. Saline nasal sprays or aerosols may be helpful in soothing mucous membranes, softening crusted secretions, and removing irritants. The nurse instructs the patient in correct administration of nasal medications. To achieve maximal relief, the patient is instructed to blow the nose before applying any medication into the nasal cavity. In addition, the patient is taught to keep the head upright; spray quickly and firmly into each nostril away from the nasal septum; and wait at least 1 minute before administering the second spray. The container should be cleaned after each use and should never be shared with other people to avoid cross-contamination.

In the case of infectious rhinitis, the nurse reviews hand hygiene technique with the patient as a measure to prevent transmission of organisms. This is especially important for those in contact with vulnerable populations such as the very young, the elderly, or people who are immunosuppressed (eg, patients with human immunodeficiency virus [HIV] infection, those taking immunosuppressive medications). In the elderly and other high-risk populations, the nurse reviews the value of receiving an influenza vaccination each year to achieve immunity before the beginning of the flu season.

Viral Rhinitis (Common Cold)

Viral rhinitis is the most frequent viral infection in the general population. The term common cold often is used when referring to a URI that is self-limited and caused by a virus. The term cold refers to an infectious, acute inflammation of the mucous membranes of the nasal cavity characterized by nasal congestion, rhinorrhea, sneezing, sore throat, and general malaise. More broadly, the term refers to an acute URI, whereas terms such as rhinitis, pharyngitis, and laryngitis distinguish the sites of the symptoms. The term is also used when the causative virus is influenza (the flu). Colds are highly contagious because virus is shed for about 2 days before the symptoms appear and during the first part of the symptomatic phase.

In the United States, colds are more frequent during the late fall and winter seasons. The incidence of viral rhinitis follows a specific pattern during the year, depending on the causative agent. Although viral rhinitis can occur at any time, three periods account for the epidemics in the United States: in September, just after the opening of school; in late January; and toward the end of April.

Seasonal changes in relative humidity may affect the prevalence of colds. The most common cold-causing viruses survive better when humidity is low, in the colder months of the year.

Colds are believed to be caused by as many as 200 different viruses (National Institute of Allergy and Infectious Disease, 2007). Rhinoviruses are the most likely causative organisms. Other viruses implicated in the common cold include coronavirus, adenovirus, respiratory syncytial virus, influenza virus, and parainfluenza virus. Each virus may have multiple strains; as a result, people are susceptible to colds throughout life (Tierney, McPhee & Papadakis, 2007). Development of a vaccine against the multiple strains of virus is almost impossible. Immunity after recovery is variable and depends on many factors, including a person's natural host resistance and the specific virus that caused the cold. Despite popular belief, cold temperatures and exposure to cold rainy weather do not increase the incidence or severity of the common cold.

Clinical Manifestations

Signs and symptoms of viral rhinitis are low-grade fever, nasal congestion, rhinorrhea and nasal discharge, halitosis, sneezing, tearing watery eyes, "scratchy" or sore throat, general malaise, chills, and often headache and muscle aches. As the illness progresses, cough usually appears. In some people, the virus exacerbates **herpes simplex,** commonly called a cold sore (Chart 22-3).

The symptoms of viral rhinitis may last from 1 to 2 weeks. If severe systemic respiratory symptoms occur, it is no longer considered viral rhinitis but one of the other acute URIs. Allergic conditions can affect the nose, mimicking the symptoms of a cold.

Medical Management

Management consists of symptomatic therapy that includes an adequate fluid intake, rest, prevention of chilling, and use of expectorants as needed. Warm salt-water gargles soothe the sore throat, and nonsteroidal anti-inflammatory drugs (NSAIDs), such as aspirin or ibuprofen, relieve aches and pains. Antihistamines are used to relieve sneezing, rhinorrhea, and nasal congestion.

Chart 22-3 • *Colds and Cold Sores (Herpes Simplex Virus HSV-1)*

Herpes labialis is an infection that is caused by the herpes simplex virus. It is characterized by an eruption of small, painful blisters on the skin of the lips, mouth, gums, tongue, or the skin around the mouth. The blisters are commonly referred to as "cold sores" or "fever blisters." Once the person is infected with this virus, it can lie latent in the cells for a period of time. The incubation period is about 2 to 12 days. It is activated by overexposure to sunlight or wind, colds, influenza and similar infections, heavy alcohol use, and physical or emotional stress.

Herpes labialis is extremely common and is caused by the herpes simplex virus type 1. HSV-1 is also an important cause of genital herpes, which is increasing in college students and selected populations in the United States (Xu, Sternberg, Kottiri, et al., 2006). (In contrast, HSV-2 typically causes painful vesicular and ulcerative lesions in the genital and anal areas.) Most Americans are infected with the type 1 virus by the age of 20 years, because HSV-1 is typically transmitted during childhood through nonsexual contact. Herpes labialis is extremely contagious and can be spread through contaminated razors, towels, and dishes. Oral/genital contact can spread oral herpes to the genitals (and vice versa). People with active herpetic lesions should avoid oral sex. It is extremely important for patients to understand that the virus can be transmitted by asymptomatic people.

Early symptoms of herpes labialis include burning, itching, and increased sensitivity or tingling sensation. These symptoms may occur several days before the appearance of lesions. The lesions appear as macules or papules, progressing to small blisters (vesicles) filled with clear, yellowish fluid. They are raised, red, and painful and can break and ooze. The lesions typically extend through the epidermis and penetrate into the underlying dermis, consistent with a partial-thickness wound (Patel, Romanelli, Roberts, et al., 2007). Eventually yellow crusts slough to reveal pink, healing skin. Typically, the virus is no longer detectable in the lesion or wound 5 days after the vesicle has developed.

Medications used in the management of herpes labialis include acyclovir (Zovirax) and valacyclovir (Valtrex), which help to minimize the symptoms and the duration or length of flare-up. Other medications used for analgesia include acetaminophen with codeine and other milder forms of opioids. Topical anesthetics such as xylocaine can help in the control of discomfort. Occlusive dressings have been shown to speed the healing process. Not only do such dressings prevent desiccation and scab formation, they also maintain an aqueous wound environment rich in growth factors and matrix materials; however, occlusive dressings are not practical for lip and mucosa lesions (Patel, et al., 2007). In this case, alternatives include occlusive ointments such as Herpecin-L or docosanol (Abreva).

Guaifenesin (Mucinex), an expectorant, is available without a prescription and is used to promote removal of secretions. Several antiviral medications are available by prescription, including amantadine (Symmetrel) and rimantadine (Flumadine). These medications can reduce the severity of symptoms and may reduce the duration of the common cold. Antimicrobial agents (antibiotics) should not be used, because they do not affect the virus or reduce the incidence of bacterial complications. In addition, their inappropriate use has been implicated in development of organisms resistant to therapy.

Topical nasal decongestants (eg, phenylephrine nasal [Neo-Synephrine], oxymetazoline nasal [Afrin]) should be used with caution. Topical therapy delivers medication directly to the nasal mucosa, and its overuse can produce rhinitis **medicamentosa,** or rebound rhinitis. Most patients treat the common cold with OTC medications that produce moderate clinical benefits, such as relief of symptoms.

In addition, herbal medicines (eg, echinacea, zinc lozenges, zinc nasal spray) are frequently used to treat the common cold; however, evidence regarding their effectiveness in shortening the symptomatic phase is questionable (Linde, Barrett, Wolkart, et al., 2006; Wu, Zhang, Qiu, et al., 2007). The inhalation of steam or heated, humidified air has been a mainstay of home remedies for common cold sufferers, but the value of this therapy has not been demonstrated.

Nursing Management

Teaching Patients Self-Care

Most viruses can be transmitted in several ways: direct contact with infected secretions; inhalation of large particles from others' coughing or sneezing; or inhalation of small particles (aerosol) that may be suspended in the air for up to an hour. Handwashing (or use of alcohol-based antibacterial cleaning agents) remains the most effective measure to prevent transmission of organisms. The nurse teaches the patient how to break the chain of infection with appropriate handwashing or hand hygiene and the use of tissues to avoid the spread of the virus with coughing and sneezing. The nurse teaches methods to treat symptoms of the common cold and provides both verbal and written information to assist the patient in the prevention and management of URIs.

Rhinosinusitis

Rhinosinusitis, formerly called sinusitis, is an inflammation of the paranasal sinuses and nasal cavity. The clinical practice guideline for adult sinusitis released by the American Academy of Otolaryngology-Head and Neck Surgery Foundation (Rosenfeld, Andes, Bhattacharyya, et al., 2007) recommends use of the term rhinosinusitis since sinusitis is almost always accompanied by inflammation of the nasal mucosa. Rhinosinusitis affects one in seven Americans. About 31 million people in the United States are diagnosed with this condition each year, resulting in direct annual health care costs of $5.8 billion in ambulatory and emergency services alone (Rosenfeld, et al., 2007).

Uncomplicated rhinosinusitis is rhinosinus without extension of inflammation outside of the paranasal sinuses and

nasal cavity. Rhinosinusitis is classified by duration of symptom as acute (less than 4 weeks), subacute (4 to 12 weeks), and chronic (more than 12 weeks). Rhinosinusitis can be a bacterial or viral infection.

ACUTE RHINOSINUSITIS

Acute rhinosinusitis is classified as acute bacterial rhinosinusitis (ABRS) or viral rhinosinusitis (AVRS). Recurrent acute rhinosinusitis is characterized by four or more acute episodes of ABRS per year (Rosenfeld, et al., 2007) and is discussed with chronic rhinosinusitis.

Pathophysiology

Acute rhinosinusitis usually follows a viral URI or cold, such as an unresolved viral or bacterial infection, or an exacerbation of allergic rhinitis. Normally, the sinus openings into the nasal passages are clear and infections resolve promptly. However, if their drainage is obstructed by a deviated septum or by hypertrophied turbinates, spurs, or nasal polyps or tumors, sinus infection may persist as a smoldering (persistent) secondary infection or progress to an acute suppurative process (causing purulent discharge).

Nasal congestion, caused by inflammation, edema, and transudation of fluid secondary to URI, leads to obstruction of the sinus cavities (see Fig. 22-1). This provides an excellent medium for bacterial growth. Other conditions that can block the normal flow of sinus secretions include abnormal structures of the nose, enlarged adenoids, diving and swimming, tooth infection, trauma to the nose, tumors, and the pressure of foreign objects. Some people are more prone to rhinosinusitis because exposure to environmental hazards such as paint, sawdust, and chemicals may result in chronic inflammation of the nasal passages.

Bacterial organisms account for more than 60% of the cases of acute sinusitis. Typical pathogens include *Streptococcus pneumoniae*, *Haemophilus influenzae*, and less commonly *Staphylococcus aureus* and *Moraxella catarrhalis* (Tierney, et al., 2007). Biofilms, which consist of organized, heterogenous communities of bacteria, have been found to be 10 to 1000 times more resistant to antibiotic treatment and more likely to contribute to host resistance when compared with other bacteria. They serve as bacterial reservoirs that can cause systemic illness when released into the circulation. Although antibiotics kill bacteria in the biofilm margin, cells deep in the biofilm are not affected, allowing for regrowth once antibiotic therapy has been discontinued. Pathogens in the upper respiratory tract that form biofilms include those species listed above as well as *Pseudomonas aeruginosa* (Post, Hiller, Nistico, et al., 2007).

Other organisms that are occasionally isolated include *Chlamydia pneumoniae*, *Streptococcus pyogenes*, viruses, and fungi (*Aspergillus fumigatus*). Fungal infections occur most often in immunosuppressed patients.

Clinical Manifestations

Symptoms of ABRS include purulent nasal drainage (anterior, posterior, or both) accompanied by nasal obstruction or a combination of facial pain, pressure, or a sense of fullness (referred to collectively as facial pain–pressure–fullness), or both (Rosenfeld, et al., 2007). The facial pain–pressure–fullness may involve the anterior face or the periorbital region. The patient may also report cloudy or colored nasal discharge congestion, blockage, or stuffiness as well as a localized or diffuse headache. The occurrence of symptoms for 10 days or more days after the initial onset of upper respiratory symptoms indicates ABRS. A red streak visible in the lateral recess of the oropharynx suggests ABRS, but its presence requires further study (Thomas & Aizin, 2006).

The symptoms of AVRS are similar to those of ABRS with the exception of the duration of symptoms. Symptoms of AVRS occur for less than 10 days after the onset of upper respiratory symptoms and do not worsen (Rosenfeld, et al., 2007).

Assessment and Diagnostic Findings

A careful history and physical examination are performed. The head and neck, particularly the nose, ears, teeth, sinuses, pharynx, and chest, are examined. There may be tenderness to palpation over the infected sinus area. The sinuses are percussed using the index finger, tapping lightly to determine whether the patient experiences pain. Although less frequently performed, transillumination of the affected area may reveal a decrease in the transmission of light with rhinosinusitis (see Chapter 21). Diagnostic imaging (x-ray, computed tomography [CT], magnetic resonance imaging (MRI)) is not recommended and generally not needed for the diagnosis of acute rhinosinusitis if the patient meets clinical diagnostic criteria (Rosenfeld, et al., 2007). When a complication or alternative diagnosis is suspected, CT scans may be indicated because these scans are sensitive to inflammatory changes and bone destruction and identify anatomical variations that can guide sinus surgery if indicated.

To confirm the diagnosis of maxillary and frontal rhinosinusitis and identify the pathogen, sinus aspirates may be obtained. Flexible endoscopic culture techniques and swabbing of the sinuses have been used for this purpose.

Complications

If untreated, acute rhinosinusitis may lead to severe complications. Local complications include osteomyelitis and mucocele (cyst of the paranasal sinuses). Osteomyelitis requires prolonged antibiotic therapy and at times removal of necrotic bone. Intracranial complications, although rare, include cavernous sinus thrombosis, meningitis, brain abscess, ischemic brain infarction, and severe orbital cellulitis (Tierney, et al., 2007). Mucoceles may require surgical treatment to establish intranasal drainage or complete excision with ablation of the sinus cavity. Brain abscesses occur by direct spread and can be life-threatening. Frontal epidural abscesses are usually quiescent but can be detected by CT scan.

Medical Management

Treatment of acute rhinosinusitis depends on the cause; oral therapies can include antibiotics for bacterial cases and oral corticosteroids for acute inflammation. The goals of treatment of acute rhinosinusitis are to shrink the nasal mucosa, relieve pain, and treat infection. Because of inappropriate use of antibiotics for nonbacterial illness, including viral rhinosinusitis, and the resulting resistance that has occurred, caution must be used if oral antibiotics are prescribed. Saline lavage is an alternative to oral antibiotics and has been effective in relieving symptoms, reducing inflammation,

Table 22-2 NASAL CORTICOSTEROIDS AND COMMON SIDE EFFECTS

Nasal Corticosteroids	Side Effects	Contraindications (for all nasal corticosteroids)
Beclomethasone (Beconase)	Nasal irritation, headache, nausea, lightheadedness, epistaxis, rhinorrhea, watering eyes, sneezing, dry nose and throat	Avoid in patients with recurrent epistaxis, glaucoma, and cataracts. Patients who have been exposed to measles/varicella or who have adrenal insufficiency should avoid these medications.
Budesonide (Rhinocort)	Epistaxis, pharyngitis, cough, nasal irritation, bronchospasm	
Mometasone (Nasonex)	Headache, viral infection, pharyngitis, epistaxis, cough, dysmenorrhea, musculoskeletal pain, arthralgia	
Triamcinolone (Nasacort AQ)	Pharyngitis, epistaxis, cough, headache	

clearing the passages of stagnant mucus, and reducing the likelihood of development of opportunistic infections (Sharp, Denman, Puumala, et al., 2007).

Observation without the use of antibiotics is an option for some patients with uncomplicated ABRS (mild pain, temperature of less than 38.3°C [101°F]). In this case, follow-up is essential. When ABRS is confirmed, antibiotic therapy is prescribed. Amoxicillin (Amoxil) is the antibiotic of choice. For patients who are allergic to penicillin, trimethoprim-sulfamethoxazole (Bactrim, Septra) (Rosenfeld, et al., 2007), macrolides (clarithromycin [Biaxin], azithromycin [Zithromax]), and quinolones (ciprofloxacin [Cipro], levofloxacin [Levaquin]) can be used. Other antibiotics used to treat ABRS include cephalosporins such as cephalexin (Keflex), cefuroxime (Ceftin), cefaclor (Ceclor), and cefixime (Suprax). Most patients improve spontaneously, and antibiotics should be reserved for patients with prolonged symptoms (Sharp, et al., 2007). However, deep-seated bacterial rhinosinusitis can be a serious infection that requires antibiotic treatment for 2 to 3 weeks.

Treatment of acute rhinosinusitis typically involves nasal saline lavage and decongestants (guaifenesin/pseudoephedrine [Entex PSE]). Decongestants or nasal saline sprays can increase patency of the ostiomeatal unit and improve drainage of the sinuses. Topical decongestants should not be used for longer than 3 or 4 days. Oral decongestants must be used cautiously in patients with hypertension. OTC antihistamines, such as diphenhydramine (Benadryl) and cetirizine (Zyrtec), and prescription antihistamines such as fexofenadine (Allegra) are used if an allergic component is suspected.

Intranasal corticosteroids have been shown to produce complete or marked improvement in acute symptoms of rhinosinusitis; however, they are not recommended as routine treatment (Rosenfeld, et al., 2007). Examples of intranasal corticosteroids, side effects, and precautions are presented in Table 22-2.

If the patient continues to have symptoms after 7 to 10 days, the sinuses may need to be irrigated.

Nursing Management

Teaching Patients Self-Care

Patient teaching is an important aspect of nursing care for the patient with acute rhinosinusitis. The nurse instructs the patient about symptoms of complications that require immediate follow-up. Referral to a physician is indicated if periorbital edema and severe pain on palpation occur. The nurse instructs the patient about methods to promote drainage of the sinuses, including humidification of the air in the home and use of warm compresses to relieve pressure. The patient is advised to avoid swimming, diving, and air travel during the acute infection. Patients using tobacco are instructed to immediately stop smoking or using any form of tobacco. Most patients use nasal sprays incorrectly, which can lead to several side effects that include nasal irritation, nasal burning, bad taste, and drainage in the throat or even epistaxis. Therefore, if an intranasal corticosteroid is prescribed, it is important to teach the patient the correct use of prescribed nasal sprays through demonstration, explanation, and return demonstration to evaluate the patient's understanding of the correct method of administration. The nurse also teaches the patient about the side effects of prescribed and OTC nasal sprays and about rebound congestion, medicamentosa. Once the decongestant is discontinued, the nasal passages close and congestion results. Appropriate medications to use for pain relief include acetaminophen (Tylenol) and NSAIDs such as ibuprofen (Advil), naproxen sodium (Aleve), and aspirin for adults older than 20 years of age.

The nurse tells patients with recurrent sinusitis to begin decongestants at the first sign of rhinosinusitis. This promotes drainage and decreases the risk of bacterial infection. Patients should also check with their health care provider or pharmacist before using OTC medications because many cold medications can worsen symptoms or other heath problems, specifically hypertension.

The nurse stresses the importance of following the recommended antibiotic regimen because a consistent blood level of the medication is critical to treat the infection. The nurse teaches the patient the early signs of a sinus infection and recommends preventive measures such as following healthy practices and avoiding contact with people with URIs.

The nurse explains to the patient that fever, severe headache, and **nuchal rigidity** (stiffness of the neck or inability to bend the neck) are signs of potential complications. Patients with chronic symptoms of rhinosinusitis who do not have marked improvement in 4 weeks with continuous medical treatment may be candidates for aspiration of the sinus or for sinus surgery.

NURSING ALERT

Patients with nasotracheal and nasogastric tubes in place are at risk for development of sinus infections. Thus, accurate assessment of patients with these tubes is critical. Removal of the nasotracheal or nasogastric tube as soon as the patient's condition permits allows the sinuses to drain, possibly avoiding septic complications.

CHRONIC RHINOSINUSITIS AND RECURRENT ACUTE RHINOSINUSITIS

Chronic rhinosinusitis (CRS) affects 14% to 16% of the U.S. population. It occurs more often in women than men. CRS accounts for almost 20 million office visits annually, and people with CRS have five times more prescriptions filled than people without CRS. It is diagnosed when the patient has experienced 12 weeks or longer of two or more of the following symptoms: mucopurulent drainage, nasal obstruction, facial pain–pressure–fullness, or decreased sense of smell. In about 29% to 36% of patients, CRS is accompanied by nasal polyps. Recurrent acute rhinosinusitis is diagnosed when four or more episodes of ABRS occur per year with no signs or symptoms of rhinosinusitis between the episodes. The use of antibiotics in people with recurrent acute rhinosinusitis is even higher than in CRS. Both CRS and recurrent acute rhinosinusitis affect quality of life as well as physical and social function (Rosenfeld, et al., 2007).

Pathophysiology

Mechanical obstruction in the ostia of the frontal, maxillary, and anterior ethmoid sinuses (known collectively as the ostiomeatal complex) is the usual cause of CRS and recurrent acute rhinosinusitis. Obstruction prevents adequate drainage of the nasal passages, resulting in accumulation of secretions and an ideal medium for bacterial growth. Persistent blockage in an adult may occur because of infection, allergy, or structural abnormalities. Other associated conditions and factors may include cystic fibrosis, ciliary dyskinesia, neoplastic disorders, gastroesophageal reflux disease, tobacco use, and environmental pollution (Rosenfeld, et al., 2007).

Both aerobic and anaerobic bacteria have been implicated in chronic rhinosinusitis and recurrent rhinosinusitis. Common aerobic bacteria include alpha-hemolytic streptococci, microaerophilic streptococci, and *S. aureus*. Common anaerobic bacteria include gram-negative bacilli, *Peptostreptococcus*, and *Fusobacterium*.

In addition, immunodeficiency should be considered in patients with CRS or acute recurrent rhinosinusitis. Acute fulminant/invasive sinusitis is a life-threatening illness and is commonly attributed to *Aspergillus* in immunocompromised patients. Chronic fungal sinusitis also poses a risk. Chronic invasive fungal sinusitis occurs in immunocompromised patients along with fungus ball/mycetoma and allergic fungal sinusitis, the more common forms of chronic fungal sinusitis, which are considered noninvasive conditions in immunocompromised patients. The fungus ball is usually a brown or greenish-black material with the consistency of peanut butter or cottage cheese. Symptoms include nasal stuffiness, nasal discharge, and facial pain (Taxy, 2006).

Clinical Manifestations

Clinical manifestations of CRS include impaired mucociliary clearance and ventilation, cough (because the thick discharge constantly drips backward into the nasopharynx), chronic hoarseness, chronic headaches in the periorbital area, and facial pain. As a result of chronic nasal congestion, the patient is usually required to breathe through the mouth. Snoring, sore throat, and, in some situations, adenoidal hypertrophy may also occur. Periorbital edema and facial pain are common. These symptoms are generally most pronounced on awakening in the morning. Fatigue and nasal congestion are also common. Many patients experience a decrease in smell and taste and a sense of fullness in the ears.

Assessment and Diagnostic Findings

The health assessment focuses on onset and duration of symptoms. It addresses the quantity and quality of nasal discharge and cough, the presence of pain, factors that relieve or aggravate the pain, and allergies. It is essential to obtain any history of comorbid conditions, including asthma, and history of tobacco use. A history of fever, fatigue, previous episodes and treatments, and previous response to therapies is also obtained.

In the physical assessment, the external nose is evaluated for any evidence of anatomical abnormality. A crooked-appearing external nose may imply septal deviation internally. The nasal mucous membranes are assessed for erythema, pallor, atrophy, edema, crusting, discharge, polyps, erosions, and septal perforations or deviations. Appropriate lighting improves visualization of the nasal cavity and should be used in every examination. Pain on examination of the teeth and with tapping with a tongue blade suggests tooth infection.

Assessment of the posterior oropharynx may reveal purulent or mucoid discharge, which is indicative of an infection caused by CRS. The patients' eyes are examined for conjunctival erythema, tearing, photophobia, and edema of the lids. Additional assessment techniques include transillumination of the sinuses and palpation of the sinuses. The frontal and maxillary sinuses are palpated, and the patient is asked whether this produces tenderness. The pharynx is inspected for erythema and discharge and palpated for cervical node adenopathy (Rosenfeld, et al., 2007).

Imaging studies such as x-ray, sinoscopy, ultrasound, CT, and MRI may be used in the diagnosis of chronic rhinosinusitis. X-ray is an inexpensive and readily available tool to assess disorders of the paranasal sinuses. CT of the paranasal sinuses can identify mucosal abnormalities, sinus ostial obstruction, anatomical variants, sinonasal polyposis, and neoplastic disease. In addition, nasal endoscopy allows for visualization of the posterior nasal cavity, nasopharynx, and sinus drainage pathways and can identify posterior septal deviation and polyps. Osseous destruction, extrasinus extension of the disease process, and local invasion suggest malignancy (Rosenfeld, et al., 2007).

Complications

Complications of chronic rhinosinusitis, although uncommon, include severe orbital cellulitis, subperiosteal abscess, cavernous sinus thrombosis, meningitis, encephalitis, and ischemic infarction. Chronic rhinosinusitis can lead to

intracranial infection either by direct spread through bone or via venous channels, resulting in epidural abscess, subdural empyema, meningitis, and brain abscess. Clinical sequelae can include personality changes with frontal lobe abscesses, headache, symptoms of elevated intracranial pressure to include alterations of consciousness, visual changes, focal neurologic deficits, seizures, and, ultimately, coma and death.

Frontal rhinosinusitis can lead to osteomyelitis of the frontal bones. Patients typically present with headache, fever, and a characteristic doughy edema over the involved bone. Ethmoid rhinosinusitis may result in orbital cellulitis, which usually begins with edema of the eyelids and rapidly progresses to ptosis (droopy eyelid), proptosis (bulging eye), chemosis (edema of the bulbar conjunctiva), and diminished extraocular movements. Patients are usually febrile and acutely ill and require immediate attention because pressure on the optic nerve can lead to loss of vision and spread of infection can lead to intracranial infection. Cavernous sinus thrombophlebitis can be a result of extension of infection along venous channels from the orbit, ethmoid, frontal sinuses, or nose. Symptoms may include altered consciousness, lid edema, and proptosis, as well as third, fourth, and sixth cranial nerve palsies.

Medical Management

Medical management of chronic rhinosinusitis and recurrent acute rhinosinusitis is similar to that of acute rhinosinusitis. Early identification of risk factors guides the selection of treatment and leads to early intervention and ultimately better patient outcomes. General measures include adequate hydration, steam inhalation 20 to 30 minutes three times per day whenever possible, saline irrigation (Harvey, Hannan, Badia, et al., 2007), and saline nose drops. Patients are instructed to sleep with the head of the bed elevated and to avoid exposure to cigarette smoke and fumes. Patients are cautioned to avoid caffeine and alcohol, which can cause dehydration.

Prescribed medications may be necessary. Antibiotics include amoxicillin, trimethoprim-sulfamethoxazole, doxycycline (Vibramycin), amoxicillin–clavulanic acid (Augmentin), cefpodoxime (Vantin), cefuroxime axetil, telithromycin (Ketek), azithromycin, clarithromycin, and levofloxacin. The course of antibiotic treatment for chronic rhinosinusitis and recurrent acute bacterial rhinosinusitis may be as long as 3 to 4 weeks to effectively eradicate the offending organism. Medications commonly used for relief of symptoms include loratadine (Claritin), fexofenadine, cetirizine, chlorpheniramine (Chlor-Trimeton), and diphenhydramine. For patients with concomitant asthma, leukotriene inhibitors such as montelukast, and zafirlukast may be used. Commonly used nasal steroids include mometasone furoate (Nasonex) and fluticasone propionate (Flonase). If allergies are a possible cause of chronic rhinosinusitis, oral antihistamines or nasal corticosteroids may also be prescribed. The use of intranasal inhalations has been associated with a significant improvement of symptoms of chronic rhinosinusitis and a reduction in nasal bacteria (Harvey, et al., 2007).

Surgical Management

If standard medical therapy fails and symptoms persist, surgery, usually endoscopic, may be indicated to correct structural deformities that obstruct the ostia (openings) of the sinuses. Minimally invasive surgical procedures are used, reducing postoperative discomfort and producing significant improvement in the patient's quality of life. Some of the specific procedures performed include excising and cauterizing nasal polyps, correcting a deviated septum, incising and draining the sinuses, aerating the sinuses, and removing tumors. Antimicrobial agents are administered before and after surgery. Computer-assisted or computer-guided surgery is used to increase the precision of the surgical procedure and to minimize complications (Stelter, Andratschke, Leunig, et al., 2006). Some patients with severe chronic rhinosinusitis obtain relief only by moving to a dry climate.

If rhinosinusitis is caused by a fungal infection, surgery is required to excise the fungus ball and necrotic tissue and drain the sinuses. Patients require aggressive surgical débridement and drainage as well as systemic antifungal medications. Although chronic invasive fungal rhinosinusitis tends to respond well to conservative medical management, surgical intervention may be required in acute invasive fungal rhinosinusitis.

Nursing Management

Because the patient usually performs care measures for sinusitis at home, nursing management consists mainly of patient teaching.

Teaching Patients Self-Care

Many people with sinus infections tend to blow their nose frequently and with force to clear their nasal passages. However, doing so often increases the symptoms. Therefore, the patient is instructed to blow the nose gently and to use tissue to remove the nasal drainage. Increasing fluid intake, applying local heat (hot wet packs), and elevating the head of the bed promote drainage of the sinuses. The nurse also instructs the patient about the importance of following the prescribed medication regimen. Instructions on the early signs of a sinus infection are provided, and preventive measures are reviewed. The nurse instructs the patient about signs and symptoms that require follow-up and provides these instructions verbally and in writing. Instructions in alternate formats (eg, large font, patient's language) may be needed to increase the patient's understanding and adherence to the treatment plan. The nurse encourages the patient to follow-up with his or her primary health care provider if symptoms persist.

NURSING ALERT

URIs, specifically chronic rhinosinusitis and recurrent acute rhinosinusitis, may be linked to primary or secondary immune deficiency or treatment with immunosuppressive therapy (ie, for cancer or organ transplantation). Typical symptoms may be blunted or absent due to immunosuppression. Immunocompromised patients are at increased risk for acute or chronic fungal infections; these infections can progress rapidly and become life-threatening. Thus, assessment, early reporting of symptoms to the physician, and immediate initiation of treatment are essential.

Pharyngitis

ACUTE PHARYNGITIS

Acute **pharyngitis** is a sudden painful inflammation of the pharynx, the back portion of the throat that includes the posterior third of the tongue, soft palate, and tonsils. It is commonly referred to as a sore throat. In the United States, it is estimated that approximately 11 million people experience pharyngitis each year. Because of environmental exposure to viral agents and poorly ventilated rooms, the incidence of viral pharyngitis peaks during winter and early spring in regions that have warm summers and cold winters. Viral pharyngitis spreads easily in the droplets of coughs and sneezes and unclean hands that have been exposed to the contaminated fluids.

Pathophysiology

Viral infection causes most cases of acute pharyngitis. Responsible viruses include the adenovirus, influenza virus, Epstein-Barr virus, and herpes simplex virus. Bacterial infection accounts for the remainder of cases. Ten percent of adults with pharyngitis have group A beta-hemolytic streptococcus (GABHS), which is commonly referred to as group A streptococcus (GAS) or streptococcal pharyngitis. Streptococcal pharyngitis warrants use of antibiotic treatment. When GAS causes acute pharyngitis, the condition is known as strep throat. The body responds by triggering an inflammatory response in the pharynx. This results in pain, fever, vasodilation, edema, and tissue damage, manifested by redness and swelling in the tonsillar pillars, uvula, and soft palate. A creamy exudate may be present in the tonsillar pillars (Fig. 22-2). Other bacterial organisms implicated in acute pharyngitis include *Mycoplasma pneumoniae*, *Neisseria gonorrhoeae*, and *H. influenzae* type B (Braun, Wagner, Huttner, et al., 2006). *M. pneumoniae* is one of the most common known bacterial pathogens of the respiratory tract and is encountered frequently in people with upper respiratory symptoms.

Uncomplicated viral infections usually subside promptly, within 3 to 10 days after the onset. However, pharyngitis caused by more virulent bacteria, such as GAS, is a more severe illness. If left untreated, the complications can be severe and life-threatening. Complications include sinusitis, otitis media, peritonsillar abscess, mastoiditis, and cervical adenitis. In rare cases, the infection may lead to bacteremia, pneumonia, meningitis, rheumatic fever, and nephritis.

Clinical Manifestations

The signs and symptoms of acute pharyngitis include a fiery-red pharyngeal membrane and tonsils, lymphoid follicles that are swollen and flecked with white-purple exudate, enlarged and tender cervical lymph nodes, and no cough. Fever (higher than 38.3°C [101°F]), malaise, and sore throat also may be present. Occasionally, patients with GAS pharyngitis exhibit vomiting, anorexia, and a scarlatina-form rash with urticaria known as scarlet fever.

People who have streptococcal pharyngitis suddenly develop a painful sore throat 1 to 5 days after being exposed to the streptococcus bacteria. They usually report malaise, fever (with or without chills), headache, myalgia, painful cervical adenopathy, and nausea. The tonsils appear swollen and erythematous, and they may or may not have an exudate. The roof of the mouth is often erythematous and may demonstrate petechiae. Bad breath is common.

Assessment and Diagnostic Findings

Accurate diagnosis of pharyngitis is essential to determine the cause (viral or bacterial) and to initiate treatment early. Once a definitive diagnosis of GAS is made, administration of appropriate antibiotics hastens symptom resolution and reduces the transmission of the illness. The most dependable method of testing relies on swab specimens obtained from posterior pharynx and tonsils as recommended by the Infectious Diseases Society of America (Fox, Marcon & Bonsu, 2006). Both the tonsillar pillars and the posterior pharyngeal wall should be touched by the swabs; the tongue should not be included. In most communities, preliminary culture reports are available in 24 hours.

Newer and more rapid diagnostic tests (eg, the rapid streptococcal antigen test [RSAT] are available. However, the accuracy of rapid antigen tests for detecting GAS in throat specimens varies widely, depending on the person performing the test. When RSAT is performed correctly and used together with professional clinical evaluation, it is considered a valid test for the diagnosis of GAS (Humair, Revaz, Bovier, et al., 2006).

RSAT is also available for self-testing; however, back-up culture of negative rapid antigen tests should be performed in all settings to reliably diagnose GAS pharyngitis. Therefore, self-testing is not recommended (Fox, Cohen, Marcon, et al., 2006).

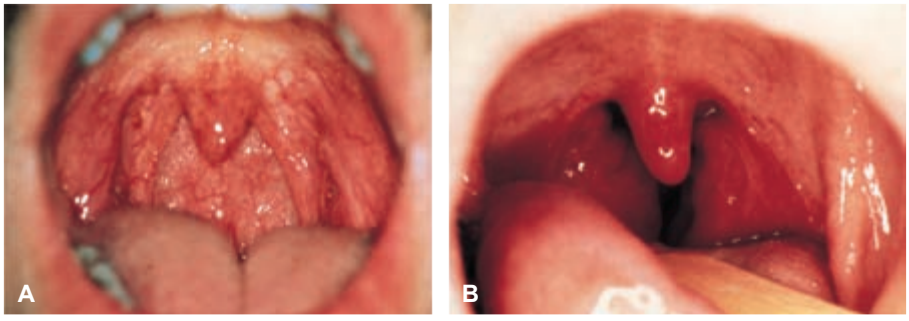

Figure 22-2 Pharyngitis—inflammation without exudate. **A,** Redness and vascularity of the pillars and uvula are mild to moderate. **B,** Redness is diffuse and intense. Each patient would probably complain of a sore throat. From Bickley, L. S. (2007). *Bates' guide to physical examination and history taking* (9th ed.). Philadelphia: Lippincott Williams & Wilkins.

Medical Management

Viral pharyngitis is treated with supportive measures because antibiotics have no effect on the causal organism. Bacterial pharyngitis is treated with a variety of antimicrobial agents.

Pharmacologic Therapy

If the cause of pharyngitis is bacterial, penicillin is usually the treatment of choice. Penicillin V potassium given for 5 days is the regimen of choice. Traditionally, penicillin was administered as a single injection; however, oral forms are used more often and are as effective and less painful than injections. Penicillin injections are recommended only if there is a concern that the patient will not comply with therapy (Tierney, et al., 2007).

For patients who are allergic to penicillin or have organisms that are resistant to erythromycin (one fifth of GAS and most *S. aureus* organisms are resistant to penicillin and erythromycin), cephalosporins, and macrolides (clarithromycin and azithromycin) may be used. Once-daily azithromycin may be given for only 3 days due to its long half-life (Tierney, et al., 2007). A 5- or 10-day course of cephalosporin may be prescribed. Five-day administration of cefpodoxime and cefuroxime has also been successful in producing bacteriologic cures.

Severe sore throats can also be relieved by analgesic medications, as prescribed. For example, aspirin or acetaminophen can be taken at 4- to 6-hour intervals; if required, acetaminophen with codeine can be taken three or four times daily. Some patients find salt-water gargling to be soothing. In severe cases, gargles with benzocaine may relieve symptoms.

Nutritional Therapy

A liquid or soft diet is provided during the acute stage of the disease, depending on the patient's appetite and the degree of discomfort that occurs with swallowing. Cool beverages, warm liquids, and flavored frozen desserts such as Popsicles are often soothing. Occasionally, the throat is so sore that liquids cannot be taken in adequate amounts by mouth. In severe situations, intravenous (IV) fluids may be needed. Otherwise, the patient is encouraged to drink as much fluid as possible (at least 2 to 3 L per day).

Nursing Management

Nursing care for patients with viral pharyngitis focuses on symptomatic management. For patients who demonstrate signs of strep throat and have a history of rheumatic fever, who appear toxic, who have clinical scarlet fever, or who have symptoms suggesting peritonsillar abscess, nursing care focuses on prompt initiation and correct administration of prescribed antibiotic therapy. The nurse instructs the patient about signs and symptoms that warrant prompt contact with the physician. These include dyspnea, drooling, inability to swallow, and inability to fully open the mouth.

The nurse instructs the patient to stay in bed during the febrile stage of illness and to rest frequently once up and about. Used tissues should be disposed of properly to prevent the spread of infection. The nurse (or the patient or family member, if the patient is not hospitalized) should examine the skin once or twice daily for possible rash, because acute pharyngitis may precede some other communicable diseases (eg, rubella).

Depending on the severity of the pharyngitis and the degree of pain, warm saline gargles or throat irrigations are used. The benefits of this treatment depend on the degree of heat that is applied. The nurse teaches the patient about these procedures and about the recommended temperature of the solution: high enough to be effective and as warm as the patient can tolerate, usually 40.6°C to 43.3°C (105°F to 110°F). Irrigating the throat may reduce spasm in the pharyngeal muscles and relieve soreness of the throat.

An ice collar also can relieve severe sore throats. Mouth care may promote the patient's comfort and prevent the development of fissures (cracking) of the lips and oral inflammation when bacterial infection is present. The nurse instructs the patient to resume activity gradually and to delay returning to work or school until after 24 hours of antibiotic therapy. A full course of antibiotic therapy is indicated in patients with strep infection because of the potential complications such as nephritis and rheumatic fever, which may have their onset 2 or 3 weeks after the pharyngitis has subsided. The nurse instructs the patient and family about the importance of taking the full course of therapy and informs them about the symptoms to watch for that may indicate complications.

In addition, the nurse instructs the patient about preventive measures that include not sharing eating utensils, glasses, napkins, food, or towels; cleaning telephones after use; using a tissue to cough or sneeze; disposing of used tissues appropriately; and avoiding exposure to tobacco and secondhand smoke. The nurse also teaches the patient with pharyngitis, especially streptococcal pharyngitis, to replace his or her toothbrush with a new one.

CHRONIC PHARYNGITIS

Chronic pharyngitis is a persistent inflammation of the pharynx. It is common in adults who work in dusty surroundings, use their voice to excess, suffer from chronic cough, or habitually use alcohol and tobacco.

There are three types of chronic pharyngitis:

- Hypertrophic: characterized by general thickening and congestion of the pharyngeal mucous membrane
- Atrophic: probably a late stage of the first type (the membrane is thin, whitish, glistening, and at times wrinkled)
- Chronic granular ("clergyman's sore throat"), characterized by numerous swollen lymph follicles on the pharyngeal wall

Clinical Manifestations

Patients with chronic pharyngitis complain of a constant sense of irritation or fullness in the throat, mucus that collects in the throat and can be expelled by coughing, and difficulty swallowing. This is often associated with intermittent postnasal drip that causes minor irritation and inflammation of the pharynx. A sore throat that is worse with swallowing in the absence of pharyngitis suggests the possibility of thyroiditis, and patients with this symptom are referred for evaluation for possible thyroiditis.

Medical Management

Treatment of chronic pharyngitis is based on relieving symptoms, avoiding exposure to irritants, and correcting any upper respiratory, pulmonary, gastrointestinal, or cardiac condition that might be responsible for a chronic cough.

Nasal congestion may be relieved by short-term use of nasal sprays or medications containing ephedrine sulfate (Kondon's Nasal) or phenylephrine hydrochloride (Neo-Synephrine). For a patient with a history of allergy, one of the antihistamine decongestant medications, such as Pseudoephedrine (Sudafed) or brompheniramine/pseudoephedrine, is prescribed orally every 4 to 6 hours. Aspirin (for patients older than 20 years of age) or acetaminophen is recommended for its anti-inflammatory and analgesic properties.

For adults with chronic pharyngitis, tonsillectomy is an effective option, if consideration is given to morbidity and complications relating to the surgery. For further information, see the section Tonsillitis and Adenoiditis, below.

Nursing Management

Teaching Patients Self-Care

To prevent the infection from spreading, the nurse instructs the patient to avoid contact with others until the fever subsides. The nurse recommends avoidance of alcohol, tobacco, secondhand smoke, and exposure to cold or to environmental or occupational pollutants. The patient may minimize exposure to pollutants by wearing a disposable facemask. The nurse encourages the patient to drink plenty of fluids. Gargling with warm saline solution may relieve throat discomfort. Lozenges keep the throat moistened.

Tonsillitis and Adenoiditis

The tonsils are composed of lymphatic tissue and are situated on each side of the oropharynx. The faucial or palatine tonsils and lingual tonsils are located behind the pillars of fauces and tongue, respectively. They frequently serve as the site of acute infection (**tonsillitis**). Acute tonsillitis can be confused with pharyngitis. Chronic tonsillitis is less common and may be mistaken for other disorders such as allergy, asthma, and sinusitis.

The adenoids or pharyngeal tonsils consist of lymphatic tissue near the center of the posterior wall of the nasopharynx. Infection of the adenoids frequently accompanies acute tonsillitis. Frequently occurring bacterial pathogens include GABHS, the most common organism. The most common viral pathogen is Epstein-Barr virus, present in 90% of affected adults. Cytomegalovirus may also cause tonsillitis and adenoiditis. Often thought of as a childhood disorder, tonsillitis can occur in adults.

Clinical Manifestations

The symptoms of tonsillitis include sore throat, fever, snoring, and difficulty swallowing. Enlarged adenoids may cause mouth-breathing, earache, draining ears, frequent head colds, bronchitis, foul-smelling breath, voice impairment, and noisy respiration. Unusually enlarged adenoids fill the space behind the posterior nares, making it difficult for the air to travel from the nose to the throat and resulting in nasal obstruction. Infection can extend to the middle ears by way of the auditory (eustachian) tubes and may result in acute otitis media, which can lead to spontaneous rupture of the tympanic membranes (eardrums) and further extension of the infection into the mastoid cells, causing acute mastoiditis. The infection also may reside in the middle ear as a chronic, low-grade, smoldering process that eventually may cause permanent deafness.

Assessment and Diagnostic Findings

The diagnosis of acute tonsillitis is primarily clinical, with attention given to whether the illness is viral or bacterial in nature. As in acute pharyngitis, RSAT is quick and convenient; however, it is less sensitive than the throat swab culture.

A thorough physical examination is performed, and a careful history is obtained to rule out related or systemic conditions. The tonsillar site is cultured to determine the presence of bacterial infection. When cytomegalovirus infection is present, the differential diagnosis should include HIV, hepatitis A, and rubella (McKerrow, 2007). In adenoiditis, if recurrent episodes of suppurative otitis media result in hearing loss, comprehensive audiometric assessment is warranted (see Chapter 59).

Medical Management

Tonsillitis is treated through the use of supportive measures that include increased fluid intake, analgesics, salt-water gargles, and rest. Bacterial infections are treated with penicillin (first-line therapy) or cephalosporins. Viral tonsillitis is not effectively treated with antibiotic therapy.

Tonsillectomy and adenoidectomy continue to be commonly performed surgical procedures, with evolving surgical techniques aimed at reducing complications and improving postoperative recovery. Patients who experience no adverse events for 6 hours have a low overall risk of later bleeding and other complications (Tierney, et al., 2007). Adults who have undergone a tonsillectomy to treat recurrent streptococcal infections experience a decease in the number of episodes of streptococcal or other throat infections or days with throat pain (Alho, Koivunen, Penna, et al., 2007).

Tonsillectomy or adenoidectomy is indicated if the patient has had repeated episodes of tonsillitis despite antibiotic therapy; hypertrophy of the tonsils and adenoids that could cause obstruction and obstructive sleep apnea; repeated attacks of purulent otitis media; suspected hearing loss due to serous otitis media that has occurred in association with enlarged tonsils and adenoids; and in some other conditions, such as an exacerbation of asthma or rheumatic fever. Indications for adenoidectomy include chronic nasal airway obstruction, chronic rhinorrhea, obstruction of the eustachian tube with related ear infections, and abnormal speech. Surgery is also indicated if the patient has developed a peritonsillar abscess that occludes the pharynx, making swallowing difficult and endangering the patency of the airway (particularly during sleep). The presence of persistent tonsillar asymmetry should prompt an excisional biopsy to rule out lymphoma (Tierney, et al., 2007). Antibiotic therapy may be initiated for patients undergoing tonsillectomy or adenoidectomy. Therapy may include oral penicillin, and

cephalosporin (eg, cefdinir [Omnicef]), or moxifloxacin (Avelox).

Nursing Management

Providing Postoperative Care

Continuous nursing observation is required in the immediate postoperative and recovery periods because of the significant risk of hemorrhage. In the immediate postoperative period, the most comfortable position is prone, with the patient's head turned to the side to allow drainage from the mouth and pharynx. The nurse must not remove the oral airway until the patient's gag and swallowing reflexes have returned. The nurse applies an ice collar to the neck, and a basin and tissues are provided for the expectoration of blood and mucus.

Symptoms of postoperative complications include fever, throat pain, ear pain, and bleeding. Pain can be effectively controlled with analgesic medications. Postoperative bleeding, which occurs in only 2% to 4% of tonsillectomy cases, may be classified as primary (occurring within the first 24 hours), or secondary (occurring between 24 hours and 8 days). The blood may be bright red if the patient expectorates it before swallowing it. If the patient swallows the blood, it becomes brown because of the action of the acidic gastric juice. If the patient vomits large amounts of dark blood or bright-red blood at frequent intervals, or if the pulse rate and temperature rise and the patient is restless, the nurse notifies the surgeon immediately. The nurse should have the following items ready for examination of the surgical site for bleeding: a light, a mirror, gauze, curved hemostats, and a waste basin.

Occasionally, suture or ligation of a bleeding vessel is required. In such cases, the patient is taken to the operating room and given general anesthesia. After ligation, continuous nursing observation and postoperative care are required, as in the initial postoperative period. If there is no bleeding, water and ice chips may be given to the patient as soon as desired. The patient is instructed to refrain from too much talking and coughing because these activities can produce throat pain.

Postoperative antibiotics are often prescribed to prevent complications. The possible benefits of antibiotic use should be weighed against the risks.

Teaching Patients Self-Care

Tonsillectomy and adenoidectomy are usually performed as outpatient surgery and the patient is sent home from the recovery room once awake, oriented, and able to drink liquids and void. The patient and family must understand the signs and symptoms of hemorrhage. As previously stated, bleeding may occur up to 8 days after surgery. The nurse instructs the patient about use of liquid acetaminophen with or without codeine for pain control and explains that the pain will subside during the first 3 to 5 days. The nurse informs the patient about the need to take the full course of any prescribed antibiotic.

Alkaline mouthwashes and warm saline solutions are useful in coping with the thick mucus and halitosis that may be present after surgery. The nurse should explain to the patient that a sore throat, stiff neck, minor ear pain, and vomiting may occur in the first 24 hours. The patient should eat an adequate diet with soft foods, which are more easily swallowed than hard foods. The patient should avoid spicy, hot, acidic, or rough foods. Milk and milk products (ice cream and yogurt) may be restricted because they make removal of mucus more difficult for some patients. The nurse instructs the patient about the need to maintain good hydration. It is important to tell the patient to avoid vigorous tooth brushing or gargling because these activities can cause bleeding. The nurse encourages the use of a cool-mist vaporizer or humidifier in the home postoperatively. The patient should avoid smoking and heavy lifting or exertion for 10 days.

Peritonsillar Abscess

Peritonsillar abscess (also called quinsy) is the most common major suppurative complication of sore throat. This collection of purulent exudate between the tonsillar capsule and the surrounding tissues, including the soft palate, may develop after an acute tonsillar infection that progresses to a local cellulitis and abscess. However, many patients do not experience symptoms or report a respiratory tract infection prior to diagnosis (Dunn, Lane, Everitt, et al., 2007). The most common causative organism is GABHS (Kaminski, 2007). In more severe cases, the infection can spread over the palate and to the neck and chest. Edema can cause airway obstruction, which can be life-threatening and is a medical emergency. Peritonsillar abscess can be life-threatening with mediastinitis, intracranial abscess, and empyemas resulting from spread of infection. Early detection and aggressive management are essential (Collin & Beasley, 2006). Although peritonsillar abscess is most common between 20 and 40 years, it can occur at any age. In older adults, it can progress to mediastinitis (Kinzer, Maier & Ridder, 2007).

Clinical Manifestations

The person with a peritonsillar abscess appears acutely ill. The patient often has a severe sore throat, fever, trismus (inability to open the mouth), and drooling. Inflammation of the medial pterygoid muscle that lies lateral to the tonsil results in spasm, severe pain, and difficulty in opening the mouth fully. The pain may be so intense that the patient has difficulty swallowing saliva. The patient's breath often smells rancid. Other symptoms include a raspy voice, odynophagia (a severe sensation of burning, squeezing pain while swallowing), **dysphagia** (difficulty swallowing), and otalgia (pain in the ear). Odynophagia is caused by the inflammation of the superior constrictor muscle of the pharynx that forms the lateral wall of the tonsil. This causes pain on lateral movement of the head. The patient may also have tender and enlarged cervical lymph nodes. Examination of the oropharynx reveals erythema of the anterior pillar and soft palate as well as a purulent tonsil on the side of the peritonsillar abscess. The tonsil is pushed inferomedially and the uvula is shifted contralaterally. The patient may also have erythema of the skin of the chest.

If the clinical presentation reveals bilateral swollen tonsils with a midline uvula, bilateral peritonsillar abscess should be a consideration.

Assessment and Diagnostic Findings

Emergency department physicians are often required to make the diagnosis of peritonsillar abscess and to decide whether aspiration, an invasive procedure, should be carried out based on the patient's clinical picture. Intraoral ultrasound and transcutaneous cervical ultrasound are used in the diagnosis of peritonsillar cellulitis and abscesses.

Medical Management

Antimicrobial agents and corticosteroid therapy are used for treatment of peritonsillar abscess. Antibiotics (usually penicillin) are extremely effective in controlling the infection and, if they are prescribed early in the course of the disease, the abscess may resolve without needing to be incised. However, if the abscess does not resolve, treatment choices include needle aspiration, incision and drainage under local or general anesthesia, and drainage of the abscess with simultaneous tonsillectomy. Following needle aspiration (discussed below) intramuscular administration of clindamycin (Cleocin) can be used in the outpatient setting, thus reducing both antibiotic and hospital costs. Use of topical anesthetic agents and throat irrigations may be prescribed to promote comfort along with administration of prescribed analgesic agents.

Patients with signs of toxicity or complications require hospitalization for IV antibiotics, imaging studies, observation, and proper airway management. Rarely, the patient with a peritonsillar abscess presents with acute airway obstruction and requires immediate airway management. Procedures may include intubation, cricothyroidotomy, or tracheotomy.

Surgical Management

Needle aspiration may be preferred over a more extensive procedure due to its high efficacy, low cost, and patient tolerance. The mucous membrane over the swelling is first sprayed with a topical anesthetic and then injected with a local anesthetic. Single or repeated needle aspirations are performed to decompress the abscess. Alternatively, the abscess may be incised and drained. These procedures are performed best with the patient in the sitting position to make it easier to expectorate the pus and blood that accumulate in the pharynx. The patient experiences almost immediate relief. Incision and drainage is also an effective option but is more painful than needle aspiration. On occasion, patients may require a second aspiration for successful treatment of peritonsillar abscess. If 3 mL or more of purulent material is aspirated, the patient will likely need to be seen the next day for further aspiration (Viljoen & Loock, 2007).

Tonsillectomy is considered for patients who are poor candidates for needle aspiration or incision and drainage. The risk of hemorrhage following tonsillectomy to treat peritonsillar abscess is higher than that of elective tonsillectomy and may be due to the patient's previous use of aspirin for pain relief.

Nursing Management

If the patient requires intubation, cricothyroidotomy, or tracheotomy to treat airway obstruction, the nurse assists with the procedure and provides support to the patient before, during, and after the procedure. The nurse also assists with the needle aspiration when indicated.

The nurse encourages the patient to use prescribed topical anesthetic agents and assists with throat irrigations or the frequent use of mouthwashes or gargles, using saline or alkaline solutions at a temperature of 40.6°C to 43.3°C (105°F to 110°F). Gentle gargling after the procedure with a cool normal saline gargle may relieve discomfort. The patient must be upright and clearly expectorate forward. The nurse instructs the patient to gargle *gently* at intervals of 1 or 2 hours for 24 to 36 hours. Liquids that are cool or at room temperature are usually well tolerated. Adequate fluids must be provided to treat dehydration and prevent its recurrence.

The nurse also observes the patient for complications and instructs the patient about signs and symptoms of complications that require prompt attention by the physician. At discharge, the nurse provides verbal and written instructions regarding foods to avoid, when to return to work, and the need to refrain from or cease smoking; it is also important to reinforce the need for continuation of good oral hygiene.

Laryngitis

Laryngitis, an inflammation of the larynx, often occurs as a result of voice abuse or exposure to dust, chemicals, smoke, and other pollutants or as part of a URI. It also may be caused by isolated infection involving only the vocal cords. Laryngitis is also associated with gastroesophageal reflux (referred to as reflux laryngitis).

Laryngitis is very often caused by the pathogens that cause the common cold and pharyngitis; the most common cause is a virus, and laryngitis is often associated with allergic rhinitis or pharyngitis. Bacterial invasion may be secondary. The onset of infection may be associated with exposure to sudden temperature changes, dietary deficiencies, malnutrition, or an immunosuppressed state. Viral laryngitis is common in the winter and is easily transmitted to others.

Clinical Manifestations

Signs of acute laryngitis include hoarseness or **aphonia** (complete loss of voice) and severe cough. Chronic laryngitis is marked by persistent hoarseness. Other signs of acute laryngitis include sudden onset made worse by cold dry wind. The throat feels worse in the morning and improves when the patient is indoors in a warmer climate. At times, the patient presents with a dry cough and a dry, sore throat that worsens in the evening hours. If allergies are present, the uvula will be visibly edematous. Many patients also complain of a "tickle" in the throat that is made worse by cold air or cold liquids.

Medical Management

Management of acute laryngitis includes resting the voice, avoiding irritants (including smoking), resting, and inhaling cool steam or an aerosol. If the laryngitis is part of a more extensive respiratory infection caused by a bacterial organism or if it is severe, appropriate antibacterial therapy is instituted. The majority of patients recover with conservative treatment; however, laryngitis tends to be more severe in elderly patients and may be complicated by pneumonia.

For chronic laryngitis, the treatment includes resting the voice, eliminating any primary respiratory tract infection, eliminating smoking, and avoiding secondhand smoke. Topical corticosteroids, such as beclomethasone dipropionate (Vanceril), may be given by inhalation. These preparations have few systemic or long-lasting effects and may reduce local inflammatory reactions. Treatment for reflux laryngitis typically involves use of proton pump inhibitors such as omeprazole (Prilosec OTC) given once daily.

Nursing Management

The nurse instructs the patient to rest the voice and to maintain a well-humidified environment. If laryngeal secretions are present during acute episodes, expectorant agents are suggested, along with a daily fluid intake of 2 to 3 L to thin secretions. The nurse instructs the patient about the importance of taking prescribed medications, including proton pump inhibitors, and using continuous positive airway therapy at bedtime, if prescribed for obstructive sleep apnea. In cases involving infection, the nurse informs the patient that the symptoms of laryngitis often extend a week to 10 days after completion of antibiotic therapy. The nurse instructs the patient about signs and symptoms that require contacting the health care provider. These signs and symptoms include loss of voice with sore throat that makes swallowing saliva difficult, hemoptysis, and noisy respirations. It is important to report continued hoarseness after voice rest or laryngitis that persists for longer than 5 days because of the possibility of malignancy.

NURSING PROCESS

The Patient With Upper Airway Infection

Assessment

A health history may reveal signs and symptoms of headache, sore throat, pain around the eyes and on either side of the nose, difficulty in swallowing, cough, hoarseness, fever, stuffiness, and generalized discomfort and fatigue. Determining when the symptoms began, what precipitated them, what if anything relieves them, and what aggravates them is part of the assessment. The nurse should also determine any history of allergy or the existence of a concomitant illness. Inspection may reveal swelling, lesions, or asymmetry of the nose as well as bleeding or discharge. The nurse inspects the nasal mucosa for abnormal findings such as increased redness, swelling, exudate, and nasal polyps, which may develop in chronic rhinitis. The mucosa of the nasal turbinates may also be swollen (boggy) and pale, bluish-gray. The nurse palpates the frontal and maxillary sinuses for tenderness, which suggests inflammation, and then inspects the throat by having the patient open the mouth wide and take a deep breath. Redness, asymmetry, or evidence of drainage, ulceration, or enlargement of the tonsils and pharynx are abnormal. Palpation of the neck lymph nodes for enlargement and tenderness is necessary.

Diagnosis

Nursing Diagnoses

Based on the assessment data, the patient's major nursing diagnoses may include the following:

- Ineffective airway clearance related to excessive mucus production secondary to retained secretions and inflammation
- Acute pain related to upper airway irritation secondary to an infection
- Impaired verbal communication related to physiologic changes and upper airway irritation secondary to infection or swelling
- Deficient fluid volume related to decreased fluid intake and increased fluid loss secondary to diaphoresis associated with a fever
- Deficient knowledge regarding prevention of URIs, treatment regimen, surgical procedure, or postoperative care

Collaborative Problems/Potential Complications

Based on assessment data, potential complications include:

- Sepsis
- Meningitis or brain abscess
- Peritonsillar abscess, otitis media, or sinusitis

Planning and Goals

The major goals for the patient may include maintenance of a patent airway, relief of pain, maintenance of effective means of communication, normal hydration, knowledge of how to prevent upper airway infections, and absence of complications.

Nursing Interventions

Maintaining a Patent Airway

An accumulation of secretions can block the airway in patients with an upper airway infection. As a result, changes in the respiratory pattern occur, and the work of breathing increases to compensate for the blockage. The nurse can implement several measures to loosen thick secretions or to keep the secretions moist so that they can be easily expectorated. Increasing fluid intake helps thin the mucus. Use of room vaporizers or steam inhalation also loosens secretions and reduces inflammation of the mucous membranes. To enhance drainage from the sinuses, the nurse instructs the patient about positioning; this depends on the location of the infection or inflammation. For example, drainage for sinusitis or rhinitis is achieved in the upright position. In some conditions, topical or systemic medications, when prescribed, help relieve nasal or throat congestion.

Promoting Comfort

URIs usually produce localized discomfort. In sinusitis, pain may occur in the area of the sinuses, or a general headache may be produced. In pharyngitis, laryngitis, or tonsillitis, a sore throat occurs. The nurse encourages the patient to take analgesics, such as acetaminophen with codeine, as prescribed, to relieve this discomfort. A pain intensity rating scale (see Chapter 13) may be used to assess effectiveness of pain relief measures. Other helpful measures include topical

anesthetic agents for symptomatic relief of herpes simplex blisters (see Chart 22-3) and sore throats, hot packs to relieve the congestion of sinusitis and promote drainage, and warm-water gargles or irrigations to relieve the pain of a sore throat. The nurse encourages rest to relieve the generalized discomfort and fever that accompany many upper airway conditions (especially rhinitis, pharyngitis, and laryngitis). The nurse instructs the patient in general hygiene techniques to prevent the spread of infection. For postoperative care after tonsillectomy and adenoidectomy, an ice collar may reduce swelling and decrease bleeding.

Promoting Communication

Upper airway infections may result in hoarseness or loss of speech. The nurse instructs the patient to refrain from speaking as much as possible and, if possible, to communicate in writing instead. Additional strain on the vocal cords may delay full return of the voice. The nurse encourages the patient and family to use alternative forms of communication, such as a memo pad or a bell to signal for assistance.

Encouraging Fluid Intake

Upper airway infections lead to fluid loss. Sore throat, malaise, and fever may interfere with a patient's willingness to eat and drink. The nurse provides a list of easily ingested foods to increase caloric intake during the acute phase of illness. These include soups, pudding, yogurt, cottage cheese, high protein drinks, and Popsicles. The nurse encourages the patient to drink 2 to 3 L of fluid per day during the acute stage of airway infection, unless contraindicated, to thin the secretions and promote drainage. Liquids (hot or cold) may be soothing, depending on the disorder.

Promoting Home and Community-Based Care

TEACHING PATIENTS SELF-CARE. Prevention of most upper airway infections is difficult because of the many potential causes. But because most URIs are transmitted by hand-to-hand contact, the nurse teaches the patient and family techniques to minimize the spread of infection to others, including frequent handwashing. The nurse advises the patient to avoid exposure to people who are at risk for serious illness if respiratory infection is transmitted (elderly adults, immunosuppressed people, and those with chronic health problems).

The nurse teaches patients and their families strategies to relieve symptoms of URIs. It is important to reinforce the need to complete the treatment regimen, particularly when antibiotics are prescribed.

CONTINUING CARE. Referral for home care is rare. However, it may be indicated for people whose health status was compromised before the onset of the respiratory infection and for those who cannot manage self-care without assistance. In such circumstances, the home care nurse assesses the patient's respiratory status and progress in recovery. The nurse may advise elderly patients and those at increased risk from a respiratory infection to consider annual influenza and pneumococcal vaccination as recommended by the physician. A follow-up appointment with the primary care provider may be indicated for patients with compromised health status to ensure that the respiratory infection has resolved.

Monitoring and Managing Potential Complications

Although major complications of URIs are rare, the nurse must be aware of them and assess the patient for them. Because most patients with URIs are managed at home, patients and their families must be instructed to monitor for signs and symptoms and to seek immediate medical care if the patient's condition does not improve or if the patient's physical status appears to be worsening.

Sepsis or meningitis may occur in patients with compromised immune status or in those with an overwhelming bacterial infection. The patient with a URI and family members are instructed to seek medical care if the patient's condition fails to improve within several days after the onset of symptoms, if unusual symptoms develop, or if the patient's condition deteriorates. They are instructed about signs and symptoms that require further attention: persistent or high fever, increasing shortness of breath, confusion, and increasing weakness and malaise. The patient with sepsis requires expert care to treat the infection, stabilize vital signs, and prevent or treat septicemia and shock. Deterioration of the patient's condition necessitates intensive care measures (eg, hemodynamic monitoring and administration of vasoactive medications, IV fluids, nutritional support, corticosteroids) to monitor the patient's status and to support the patient's vital signs. High doses of antibiotics may be administered to treat the causative organism. The nurse's role is to monitor the patient's vital signs, hemodynamic status, and laboratory values, administer needed treatment, alleviate the patient's physical discomfort, and provide explanations, teaching, and emotional support to the patient and family.

Peritonsillar abscess may develop after an acute infection of the tonsils. The patient requires treatment to drain the abscess and receives antibiotics for infection and topical anesthetic agents and throat irrigations to relieve pain and sore throat. Follow-up is necessary to ensure that the abscess resolves; tonsillectomy may be required. The nurse assists the patient in administering throat irrigations and instructs the patient and family about the importance of adhering to the prescribed treatment regimen and recommended follow-up appointments.

In some severe situations, peritonsillar abscess may progress to meningitis or brain abscess. The nurse assesses for changes in mental status ranging from subtle personality changes through drowsiness to coma, nuchal rigidity, and focal neurologic signs that signal increasing cerebral edema around the abscess. Seizures, typically grand mal, occur in this setting. Intensive care measures are necessary. High doses of antibiotics may be used to treat the causative organism. The nurse's role is similar to caring for the patient with sepsis in an intensive care setting. The nurse monitors the patient's neurologic status and reports changes immediately to the physician.

Otitis media and rhinosinusitis may develop with URI. The patient and family are instructed about the signs and symptoms of otitis media and rhinosinusitis and about the importance of follow-up with the primary health care practitioner to ensure adequate evaluation and treatment of these conditions.

Evaluation

Expected Patient Outcomes

Expected patient outcomes may include the following:

1. Maintains a patent airway by managing secretions
   a. Reports decreased congestion
   b. Assumes best position to facilitate drainage of secretions
   c. Uses self-care measures appropriately and consistently to manage secretions during the acute phase of illness
2. Reports relief of pain and discomfort using pain intensity scale
   a. Uses comfort measures: analgesics, hot packs, gargles, rest
   b. Demonstrates adequate oral hygiene
3. Demonstrates ability to communicate needs, wants, level of comfort
4. Maintains adequate fluid and nutrition intake
5. Utilizes strategies to prevent upper airway infections and allergic reactions
   a. Demonstrates hand hygiene technique
   b. Identifies the value of the influenza vaccine
6. Demonstrates an adequate level of knowledge and performs self-care adequately
7. Becomes free of signs and symptoms of infection
   a. Exhibits normal vital signs (temperature, pulse, respiratory rate)
   b. Absence of purulent drainage
   c. Free of pain in ears, sinuses, and throat
   d. Absence of signs of inflammation
8. Absence of complications
   a. No signs of sepsis: fever, hypotension, deterioration of cognitive status
   b. Vital signs and hemodynamic status normal
   c. No evidence of neurologic involvement
   d. No signs of development of peritonsillar abscess
   e. Resolution of URI without development of otitis media or sinusitis
   f. No signs and symptoms of brain abscess

OBSTRUCTION AND TRAUMA OF THE UPPER RESPIRATORY AIRWAY

Obstruction During Sleep

Obstructive sleep apnea (OSA) is a disorder characterized by recurrent episodes of upper airway obstruction and a reduction in ventilation. It is defined as cessation of breathing (**apnea**) during sleep usually caused by repetitive upper airway obstruction. As many as 18 million Americans suffer from sleep apnea (Pagel, 2007). OSA interferes with people's ability to obtain adequate rest, thus affecting memory, learning, and decision making.

Risk factors for OAS include obesity, male gender, postmenopausal status, and advanced age. The major risk factor is obesity; a larger neck circumference and increased amounts of peripharyngeal fat narrow and compress the upper airway. OSA affects 4% of males and 2% of females. Women are not often referred for evaluation of OSA, possibly because they are less likely to report classic symptoms (Patil, Schneider, Schwartz, et al., 2007). Other associated factors include alterations in the upper airway, such as structural changes (eg, tonsillar hypertrophy, abnormal posterior positioning of one or both jaws, and variations in craniofacial structures) that contribute to the collapsibility of the upper airway.

Pathophysiology

The pharynx is a collapsible tube that can be compressed by the soft tissues and structures surrounding it. The tone of the muscles of the upper airway is reduced during sleep. Mechanical factors such as reduced diameter of the upper airway or dynamic changes in the upper airway during sleep may result in obstruction. These sleep-related changes may predispose to upper airway collapse when small amounts of negative pressure are generated during inspiration.

Repetitive apneic events result in hypoxia (decreased oxygen saturation) and hypercapnia (increased concentration of carbon dioxide), which triggers a sympathetic response. As a consequence, patients with OSA have a high prevalence of hypertension and an increased risk of myocardial infarction and stroke. In patients with preexisting cardiovascular disease, the nocturnal hypoxemia may predispose to dysrhythmias. Patients who have a diagnosis of heart failure and who have untreated OSA are at increased risk of death (Wang, Parker, Newton, et al., 2007). OSA in the absence of identifiable cardiovascular disease can increase insulin resistance and other metabolic changes that can increase the risk of vascular disease (McArdle, Hillman, Beilin, et al., 2007). OSA is more prevalent in people with coronary artery disease, congestive heart failure, metabolic syndrome, and type 2 diabetes (Patil, et al., 2007).

Clinical Manifestations

OSA is characterized by frequent and loud snoring with breathing cessation for 10 seconds or longer, for at least five episodes per hour, followed by awakening abruptly with a loud snort as the blood oxygen level drops. Patients with sleep apnea may have anywhere from five apneic episodes per hour to several hundred per night.

Classic signs and symptoms of obstructive sleep apnea include snoring, snorting, gasping, choking, and witnessed apneic episodes commonly reported by the bed partner. Common signs and symptoms of OSA are presented in Chart 22-4. Symptoms typically progress with increases in weight, aging, and during the transition to menopause (Patil, et al., 2007). Patients are typically unaware of nocturnal upper airway obstruction during sleep. They frequently complain of insomnia including difficulty in going to sleep, nighttime awakenings, and early morning awakenings with an inability to go back to sleep, as well as chronic fatigue and hypersomnolence (daytime sleepiness). When obtaining the health history, the nurse asks the patient about sleeping during normal activities such as eating or talking. Patients with this symptom are considered to have pathologic hypersomnolence (Patil, et al., 2007).

CHART 22-4 *Assessing for Obstructive Sleep Apnea (OSA)*

Be alert for the following signs and symptoms:
- Excessive daytime sleepiness
- Frequent nocturnal awakening
- Insomnia
- Loud snoring
- Morning headaches
- Intellectual deterioration
- Personality changes, irritability
- Impotence
- Systemic hypertension
- Dysrhythmias
- Pulmonary hypertension, cor pulmonale
- Polycythemia
- Enuresis

Assessment and Diagnostic Evaluation

The diagnosis of sleep apnea is based on clinical features plus a polysomnographic finding (sleep study), which is the definitive test for OSA. The test is an overnight study that measures multiple physiologic signals to include those related to sleep (electroencephalogram [EEG], electro-oculogram, segmental electrocardiogram [ECG]), respiration (airflow, thoracoabdominal effort, and oximetry), and cardiac dysrhythmia (electrocardiogram) (Patil, et al., 2007).

Medical Management

Patients usually seek medical treatment because their sleeping partners express concern or because they experience excessive sleepiness at inappropriate times or settings (eg, while driving a car). A variety of treatments are used. Weight loss and avoidance of alcohol and hypnotic medications are the first steps (Tierney, et al., 2007). In more severe cases involving hypoxemia and severe hypercapnia, the treatment includes continuous positive airway pressure (CPAP) or bilevel positive airway pressure (BiPAP) therapy with supplemental oxygen via nasal cannula. (The use of CPAP is discussed in more detail in Chapter 25.) CPAP is used to prevent airway collapse, whereas BiPAP makes breathing easier and results in a lower average airway pressure (Basner, 2007). Although these treatments are effective in management of OSA, compliance with treatment continues to be a major concern (Lin, Prasad, Pan, et al., 2007).

Surgical procedures also may be performed to correct OSA. Simple tonsillectomy may be effective for patients with larger tonsils and low body mass index (Nakata, Noda, Yanagi, et al., 2006). Uvulopalatopharyngoplasty is the resection of pharyngeal soft tissue and removal of approximately 15 mm of the free edge of the soft palate and uvula. Effective in about 50% of patients, it is more effective in eliminating snoring than apnea. Nasal septoplasty may be performed for gross anatomic nasal septal deformities. Tracheostomy relieves upper airway obstruction but has numerous adverse effects, including speech difficulties and increased risk of infections. These procedures, as well as other maxillofacial surgeries, are reserved for patients with life-threatening dysrhythmias or severe disability who have not responded to conventional therapy (Tierney, et al., 2007).

Pharmacologic Therapy

Although medications are not generally recommended for OSA, modafinil (Provigil) has been shown to reduce daytime sleepiness (Valentino & Foldvary-Schaefer, 2007). Protriptyline (Triptil) given at bedtime may increase the respiratory drive and improve upper airway muscle tone. Medroxyprogesterone acetate (Provera) and acetazolamide (Diamox) have been used for sleep apnea associated with chronic alveolar hypoventilation, but their benefits have not been well established. The patient must understand that these medications are not a substitute for CPAP or BiPAP. Administration of low-flow nasal oxygen at night can help relieve hypoxemia in some patients but has little effect on the frequency or severity of apnea. Further studies on the effectiveness of pharmacologic therapy are needed.

Nursing Management

The patient with OSA may not recognize the potential consequences of the disorder. Therefore, the nurse explains the disorder in terms that are understandable to the patient and relates symptoms (daytime sleepiness) to the underlying disorder. The nurse also instructs the patient and family about treatments, including the correct and safe use of CPAP, BiPAP, and oxygen therapy, if prescribed. The nurse teaches the patient about the risk of untreated OSA and the benefits of treatment approaches.

Epistaxis (Nosebleed)

Epistaxis, a hemorrhage from the nose, is caused by the rupture of tiny, distended vessels in the mucous membrane of any area of the nose. Rarely does epistaxis originate in the densely vascular tissue over the turbinates. Most commonly, the site is the anterior septum, where three major blood vessels enter the nasal cavity: (1) the anterior ethmoidal artery on the forward part of the roof (Kiesselbach's plexus), (2) the sphenopalatine artery in the posterosuperior region, and (3) the internal maxillary branches (the plexus of veins located at the back of the lateral wall under the inferior turbinate).

Several risk factors are associated with epistaxis (Chart 22-5).

CHART 22-5 *Risk Factors for Epistaxis*

- Local infections (vestibulitis, rhinitis, sinusitis)
- Systemic infections (scarlet fever, malaria)
- Drying of nasal mucous membranes
- Nasal inhalation of illicit drugs (eg, cocaine)
- Trauma (digital trauma as in picking the nose; blunt trauma; fracture; forceful nose blowing)
- Arteriosclerosis
- Hypertension
- Tumor (sinus or nasopharynx)
- Thrombocytopenia
- Use of aspirin
- Liver disease
- Redu-Osler-Weber syndrome (hereditary hemorrhagic telangiectasia)

Medical Management

Management of epistaxis depends on its cause and the location of the bleeding site. A nasal speculum, penlight, or headlight may be used to identify the site of bleeding in the nasal cavity. Most nosebleeds originate from the anterior portion of the nose. Initial treatment may include applying direct pressure. The patient sits upright with the head tilted forward to prevent swallowing and aspiration of blood and is directed to pinch the soft outer portion of the nose against the midline septum for 5 or 10 minutes continuously. Application of nasal decongestants (phenylephrine, one or two sprays) to act as vasoconstrictors may be necessary. If these measures are unsuccessful in stopping the bleeding, the nose must be examined using good illumination and suction to determine the site of bleeding. Topical cocaine (4%) may be applied using an applicator or spray. It serves as both an anesthetic and a vasoconstrictor. If cocaine is not available, oxymetazoline (topical decongestant) and tetracaine (Pontocaine; topical anesthetic) can be substituted with equal results. Visible bleeding sites may be cauterized with silver nitrate or electrocautery (high-frequency electrical current). A supplemental patch of Surgicel or Gelfoam may be used (Tierney, et al., 2007).

Alternatively, a cotton tampon may be used to try to stop the bleeding. Suction may be used to remove excess blood and clots from the field of inspection. The search for the bleeding site should shift from the anteroinferior quadrant to the anterosuperior, then to the posterosuperior, and finally to the posteroinferior area. The field is kept clear by using suction and by shifting the cotton tampon.

If the origin of the bleeding cannot be identified, the nose may be packed with gauze impregnated with petrolatum jelly or antibiotic ointment; a topical anesthetic spray and decongestant agent may be used before the gauze packing is inserted, or a balloon-inflated catheter may be used (Fig. 22-3). Alternatively, a compressed nasal sponge may be used. Once the sponge becomes saturated with blood or is moistened with a small amount of saline, it will expand and produce tamponade to halt the bleeding. The packing may remain in place for 48 hours or up to 5 or 6 days if necessary to control bleeding. Antibiotics may be prescribed because of the risk of iatrogenic sinusitis and toxic shock syndrome.

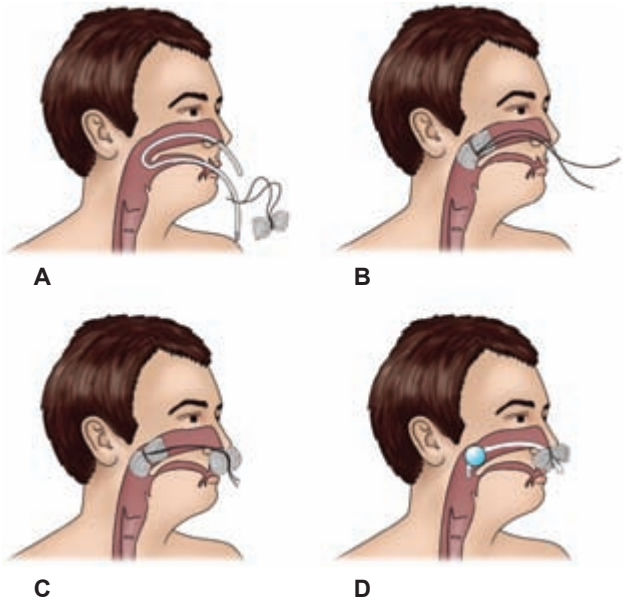

Figure 22-3 Packing to control bleeding from the posterior nose. **A,** Catheter is inserted and packing is attached. **B,** Packing is drawn into position as the catheter is removed. **C,** Strip is tied over a bolster to hold the packing in place with an anterior pack installed "accordion pleat" style. **D,** Alternative method, using a balloon catheter instead of gauze packing.

Nursing Management

The nurse monitors the patient's vital signs, assists in the control of bleeding, and provides tissues and an emesis basin to allow the patient to expectorate any excess blood. It is common for patients to be anxious in response to a nosebleed. Blood loss on clothing and handkerchiefs can be frightening, and the nasal examination and treatment are uncomfortable. Assuring the patient in a calm, efficient manner that bleeding can be controlled can help reduce anxiety. The nurse continuously assesses the patient's airway and breathing as well as vital signs. On rare occasions, a patient with significant hemorrhage requires IV infusions of crystalloid solutions (normal saline) as well as cardiac and pulse oximetry monitoring.

Teaching Patients Self-Care

Once the bleeding is controlled, the nurse instructs the patient to avoid vigorous exercise for several days and to avoid hot or spicy foods and tobacco because this may cause vasodilation and increase the risk of rebleeding. Discharge teaching includes reviewing ways to prevent epistaxis: avoiding forceful nose blowing, straining, high altitudes, and nasal trauma (including nose picking). Adequate humidification may prevent drying of the nasal passages. The nurse explains how to apply direct pressure to the nose with the thumb and the index finger for 15 minutes in the case of a recurrent nosebleed. If recurrent bleeding cannot be stopped, the patient is instructed to seek additional medical attention.

Nasal Obstruction

The passage of air through the nostrils is frequently obstructed by a deviation of the nasal septum, hypertrophy of the turbinate bones, or the pressure of nasal polyps. Chronic nasal congestion forces the patient to breath through the mouth, thus producing dryness of the oral mucosa and associated problems including persistent dry, cracked lips. Patients with chronic nasal congestion often suffer from sleep deprivation due to difficulty maintaining an adequate airway while lying flat and during sleep.

Persistent nasal obstruction also may lead to chronic infection of the nose and result in frequent episodes of nasopharyngitis. Frequently, the infection extends to the nasal sinuses. When rhinosinusitis develops and the drainage from these cavities is obstructed by deformity or swelling within the nose, pain is experienced in the region of the affected sinus.

Medical Management

The treatment of nasal obstruction requires the removal of the obstruction, followed by measures to treat whatever chronic infection exists. In many patients, an underlying

allergy also requires treatment. Measures to reduce or alleviate nasal obstruction include nonsurgical as well as surgical techniques. Commonly used medications include nasal corticosteroids (see Table 22-2) as well as oral leukotriene inhibitors, such as montelukast. Treatment with nasal corticosteroids for 1 to 3 months is usually successful for treatment of small polyps and may even reduce the need for surgical intervention. A short course of oral corticosteroids (6-day course of prednisone) may be beneficial in the treatment of nasal obstruction due to polyps (Tierney, et al., 2007). Additional medications may include antibiotics for the treatment of underlying infection or antihistamines for management of allergies. Hypertrophied turbinates may be treated by applying an astringent agent to shrink them.

A more aggressive approach in treating nasal obstruction caused by turbinate hypertrophy involves surgical reduction of the hypertrophy. Surgical procedures used to treat obstructive nasal conditions are collectively known as functional rhinoplasty. Technical advances with newer techniques provide a number of options for reconstruction and reshaping of the nose (Swartout & Toriumi, 2007).

Nursing Management

Most of the surgical procedures are performed on an outpatient basis. The nurse explains the procedure after the physician provides the initial description. Postoperatively, the nurse elevates the head of the bed to promote drainage and to alleviate discomfort from edema. Frequent oral hygiene is encouraged to overcome dryness caused by breathing through the mouth. Before discharge from the outpatient or same-day surgical unit, the patient is instructed to avoid blowing the nose with force during the postoperative recovery period. The patient is also instructed about the signs and symptoms of bleeding and infection and when to contact the physician. The patient is provided with written postoperative instructions, including emergency phone numbers.

Fractures of the Nose

The location of the nose makes it susceptible to injury. Nasal fracture is the most common facial fracture and the most common fracture in the body. Fractures of the nose usually result from a direct assault. Nasal fractures may affect the ascending process of the maxilla and the septum. The torn mucous membrane results in a nosebleed. Complications include hematoma, infection, abscess, and avascular or septic necrosis. However, as a rule, serious consequences usually do not occur.

Clinical Manifestations

The signs and symptoms of a nasal fracture are pain, bleeding from the nose externally and internally into the pharynx, swelling of the soft tissues adjacent to the nose, periorbital ecchymosis, nasal obstruction, and deformity. The patient's nose may have an asymmetric appearance that may not be obvious until the edema subsides.

Assessment and Diagnostic Findings

The nose is examined internally to rule out the possibility that the injury may be complicated by a fracture of the nasal septum and a submucosal septal hematoma. Intranasal examination is performed in all cases to rule out septal hematoma (Tierney, et al., 2007). Because of the swelling and bleeding that occur with a nasal fracture, an accurate diagnosis can be made only after the swelling subsides.

Clear fluid draining from either nostril suggests a fracture of the cribriform plate with leakage of cerebrospinal fluid. Because cerebrospinal fluid contains glucose, it can readily be differentiated from nasal mucus by means of a dipstick (Dextrostix). Usually, careful inspection or palpation discloses any deviations of the bone or disruptions of the nasal cartilages. An x-ray may reveal displacement of the fractured bones and may help rule out extension of the fracture into the skull.

Medical Management

A nasal fracture very often produces bleeding from the nasal passage. As a rule, bleeding is controlled with the use of packing. Cold compresses are used to prevent or reduce edema. For the patient who has sustained enough trauma to break the nose or any facial bone, the emergency medical team must consider the possibility of a cervical spine fracture. Therefore, it is essential to ensure a patent airway and to rule out a cervical spine fracture. Uncomplicated nasal fractures may be treated initially with antibiotics, analgesic agents, and a decongestant nasal spray.

Treatment of nasal fractures is aimed at restoring nasal function and returning the appearance of the nose to baseline. The patient is referred to a specialist to evaluate the need to realign the bones. Although improved outcomes are obtained when reduction of the fracture is performed during the first 3 hours after the injury, this is often not possible because of the edema. If immediate reduction of the fracture is not possible, it is performed within 3 to 7 days. Timing is important when treating nasal fractures because further delay in treatment may result in significant bone healing, which ultimately may require surgical intervention that includes rhinoplasty to reshape the external appearance of the nose. A septorhinoplasty is performed when the nasal septum needs to be repaired. In patients who develop a septal hematoma, the physician drains the hematoma through a small incision. A septal hematoma that is not drained can lead to permanent deformity of the nose.

Nursing Management

Immediately after the fracture, the nurse applies ice and encourages the patient to keep the head elevated. The nurse instructs the patient to apply ice packs to the nose for 20 minutes four times a day to decrease swelling. The patient who experiences bleeding from the nose (epistaxis) is usually frightened and anxious and needs reassurance. The packing inserted to stop the bleeding may be uncomfortable and unpleasant, and obstruction of the nasal passages by the packing forces the patient to breathe through the mouth. This in turn causes the oral mucous membranes to become dry. Mouth rinses help to moisten the mucous membranes and to reduce the odor and taste of dried blood in the

oropharynx and nasopharynx. Use of analgesic agents such as acetaminophen or NSAIDs such as ibuprofen or naproxen is encouraged. When removing the cotton pledgets, the nurse carefully inspects the mucosa for lacerations or a septal hematoma. The nurse instructs the patient to avoid sports activities for 6 weeks.

Laryngeal Obstruction

Obstruction of the larynx because of edema is a serious, often fatal, condition. The larynx is a stiff box that will not stretch. It contains a narrow space between the vocal cords (glottis), through which air must pass. Swelling of the laryngeal mucous membranes may close off the opening tightly, leading to life-threatening hypoxia or suffocation. Edema of the glottis occurs rarely in patients with acute laryngitis, occasionally in patients with urticaria, and more frequently in patients with severe inflammation of the throat, as in scarlet fever. It is an occasional but usually preventable cause of death in severe anaphylaxis (angioedema).

Hereditary angioedema (HAE) is also characterized by episodes of life-threatening laryngeal edema. Laryngeal edema in people with HAE can occur at any age, although young adults are at greatest risk. Risk factors for laryngeal obstruction are given in Table 22-3.

Foreign bodies frequently are aspirated into the pharynx, the larynx, or the trachea and cause a twofold problem. First, they obstruct the air passages and cause difficulty in breathing, which may lead to asphyxia; later, they may be drawn farther down, entering the bronchi or a bronchial branch and causing symptoms of irritation, such as a croupy cough, expectoration of blood or mucus, or labored breathing. The physical signs and x-ray findings confirm the diagnosis.

Clinical Manifestations

The patient's clinical presentation and x-ray findings confirm the diagnosis of laryngeal obstruction. The patient may demonstrate lowered oxygen saturation; however, normal oxygen saturation should not be interpreted as a sign that the obstruction is not significant. Use of accessory muscles to maximize airflow may occur and is often manifested by retractions in the neck or abdomen during inspirations. Patients who demonstrate these symptoms are at an immediate risk of collapse, and respiratory support (ie, mechanical ventilation or positive-pressure ventilation) is considered.

Assessment and Diagnostic Findings

A thorough history can be very useful in diagnosing and treating the patient with a laryngeal obstruction. However, emergency measures to secure the patient's airway should not be delayed to obtain a history or perform tests. If possible, the nurse obtains a history from the patient or family about heavy alcohol or tobacco consumption, current medications, history of airway problems, recent infections, pain or fever, dental pain or poor dentition, and any previous surgeries, radiation therapy, or trauma.

Rarely, patients with nasogastric tubes in place develop a postcricoid ulceration (referred to as "nasogastric tube syndrome"). This ulceration affects the posterior cricoarytenoid muscles, causing vocal cord abduction paralysis and ultimately upper airway obstruction (Marcus, Caine, Hamdan, et al., 2006).

Medical Management

Medical management is based on the initial evaluation of the patient and the need to ensure a patent airway. If the airway is obstructed by a foreign body and signs of asphyxia are apparent, immediate treatment is necessary. Frequently, if the foreign body has lodged in the pharynx and can be visualized, the finger can dislodge it. If the obstruction is in the larynx or the trachea, the clinician or other rescuer tries the subdiaphragmatic abdominal thrust maneuver (Chart 22-6). If all efforts are unsuccessful, an immediate tracheotomy is necessary (see Chapter 25 for further discussion). If the obstruction is caused by edema resulting from an allergic reaction, treatment may include immediate administration of subcutaneous epinephrine and a corticosteroid (see Chapter 53). Ice may be applied to the neck in an effort to reduce edema. Continuous pulse oximetry is essential in the patient who has experienced acute upper airway obstruction.

Cancer of the Larynx

Cancer of the larynx accounts for approximately half of all head and neck cancers. The American Cancer Society (ACS, 2007b) estimates that about 11,300 new cases and

Table 22-3 RISK FACTORS FOR LARYNGEAL OBSTRUCTION

Precipitating Event	Mechanism of Obstruction
History of allergies; exposure to medications, latex, foods (peanuts, tree nuts [eg, walnuts, pecans]), bee stings	Anaphylaxis
Foreign body	Inhalation/ingestion of meat or other food items, coin, chewing gum, balloon fragments, drug packets (ingested to avoid criminal arrest)
Heavy alcohol consumption; heavy tobacco use	Obstruction from tumor
Family history of airway problems	Suggests angioedema (type I hypersensitivity reaction)
Use of angiotensin-converting enzyme (ACE) inhibitor	Increased risk of angioedema of the mucous membranes
Recent throat pain or recent fever	Infectious process
History of surgery or previous tracheostomy	Possible subglottic stenosis
History of nasogastric tube placement	Nasogastric tube syndrome

Chart 22-6 • *Performing the Abdominal Thrust Maneuver*

To assist a patient or other person who is choking on a foreign object, the nurse performs the abdominal thrust maneuver (sometimes called the Heimlich maneuver) according to guidelines set forth by the American Heart Association. (*Note:* Hands crossed at the neck is the universal sign for choking.)

1. Stand behind the person who is choking.
2. Place both arms around the person's waist.
3. Make a fist with one hand with the thumb outside the fist.
4. Place thumb side of fist against the person's abdomen above the navel and below the xiphoid process.
5. Grasp fist with other hand.
6. Quickly and forcefully exert pressure against the person's diaphragm, pressing upward with quick, firm thrusts.
7. Apply thrusts 6 to 10 times until the obstruction is cleared.
8. The pressure from the thrusts should lift the diaphragm, force air into the lungs, and create an artificial cough powerful enough to expel the aspirated object.

3,660 deaths occur annually, with an overall survival rate of 65%. Cancer of the larynx is most common in people between the ages of 60 and 70 years (Schiech, 2007), and it occurs four to five times more frequently in men than in women.

Carcinogens that have been associated with laryngeal cancer include tobacco (smoke, smokeless) and alcohol and their combined effects (Chart 22-7). Use of chewing tobacco from other countries has increased the risk of laryngeal cancer because of its stronger potency, and the risk of laryngeal cancer may be greater than that associated with cigarette smoking (Sapkota, Gajalakshmi, Jetly, et al., 2007). Occupational exposure to coal dust, steel dust, iron compounds and fumes, formaldehyde, and dust from hard alloys (eg., still or iron compounds) is associated with hypopharyngeal or laryngeal cancer (Shangina, Brennan, Szeszenia-Dabrowska, et al., 2006). Dietary patterns of Western cultures are associated with an increased risk of supraglottic cancer of the larynx. Other risk factors include straining the voice, chronic laryngitis, nutritional deficiencies (riboflavin), and family predisposition.

Almost all malignant tumors of the larynx arise from the surface epithelium and are classified as squamous cell carcinoma. Approximately 55% of patients with laryngeal cancer present with involved lymph nodes at the time of diagnosis, with bilateral lesions present in 16% of patients (De Vita, Hellman & Rosenberg, 2005). The lifetime survival rate for patients who have small laryngeal cancers without evidence of spread to the lymph nodes is about 75% to 95%. Recurrence occurs usually within the first 2 to 3 years after diagnosis. The presence of disease after 5 years is often secondary to a new primary malignancy. The incidence of distant metastasis with squamous cell carcinoma of the head and neck (including larynx cancer) is relatively low.

CHART 22-7 *Risk Factors for Laryngeal Cancer*

Carcinogens

- Tobacco (smoke, smokeless)
- Combined effects of alcohol and tobacco
- Asbestos
- Secondhand smoke
- Paint fumes
- Wood dust
- Cement dust
- Chemicals
- Tar products
- Mustard gas
- Leather and metals

Other Factors

- Straining the voice
- Chronic laryngitis
- Nutritional deficiencies (riboflavin)
- History of alcohol abuse
- Familial predisposition
- Age (higher incidence after 60 years of age)
- Gender (more common in men)
- Race (more prevalent in African Americans)
- Weakened immune system

Clinical Manifestations

Hoarseness of more than 2 weeks' duration occurs in the patient with cancer in the glottic area because the tumor impedes the action of the vocal cords during speech. The voice may sound harsh, raspy, and lower in pitch. Affected voice sounds are not early signs of subglottic or supraglottic cancer. The patient may complain of a persistent cough or sore throat and pain and burning in the throat, especially when consuming hot liquids or citrus juices. A lump may be felt in the neck. Later symptoms include dysphagia, dyspnea (difficulty breathing), unilateral nasal obstruction or discharge, persistent hoarseness, persistent ulceration, and foul breath. Cervical lymph adenopathy, unintentional weight loss, a general debilitated state, and pain radiating to the ear may occur with metastasis.

Assessment and Diagnostic Findings

An initial assessment includes a complete history and physical examination of the head and neck. This includes identification of risk factors, family history, and any underlying medical conditions. An indirect laryngoscopy, using a flexible endoscope, is initially performed in the otolaryngologist's office to visually evaluate the pharynx, larynx, and possible tumor. Mobility of the vocal cords is assessed; if normal movement is limited, the growth may affect muscle, other tissue, and even the airway. The neck and the thyroid gland are palpated for enlarged lymph nodes and enlarged thyroid gland.

Diagnostic procedures that may be used include endoscopy, including virtual endoscopy, optical imaging, and CT. If a tumor of the larynx is suspected on an initial examination, a direct laryngoscopic examination is performed under local or general anesthesia to evaluate all areas of the larynx. In some cases, intraoperative examination obtained by direct microscopic visualization and palpation of the vocal folds may yield a more accurate diagnosis. Samples of the suspicious tissue are obtained for analysis.

The classification, including stage of the tumor (ie, size and histology of the tumor, presence and extent of cervical lymph node involvement) and location of the tumor serve as a basis for treatment. CT and MRI are used to assess regional adenopathy and soft tissues and to stage and determine the extent of a tumor. MRI is also helpful in posttreatment follow-up to detect a recurrence. Positron emission tomography (PET) scanning may also be used to detect recurrence of a laryngeal tumor after treatment.

Medical Management

The goals of treatment of laryngeal cancer include cure, preservation of safe, effective swallowing, preservation of useful voice, and avoidance of permanent tracheostoma (Tierney, et al., 2007). Treatment options include surgery, radiation therapy, and chemotherapy. The prognosis depends on the tumor stage, the patient's gender and age, and pathologic features of the tumor, including the grade and depth of infiltration. The treatment plan also depends on whether the cancer is an initial diagnosis or a recurrence. In addition, before treatment begins, a complete dental examination is performed to rule out any oral disease. Any dental problems are resolved, if possible, before surgery and radiotherapy.

For patients with early stage tumors and lesions without lymph node involvement, radiation therapy or surgery may be effective. Surgical procedures may include transoral endoscopic laser resection, classic open vertical hemilaryngectomy for glottic tumors, or classic horizontal supraglottic laryngectomy. Five-year survival rates exceed 80% to 90% with excellent patient-reported satisfaction. In supraglottic tumors, selective neck dissection or irradiation is necessary because of the high risk of neck node involvement (Tierney, et al., 2007). Chemotherapy followed by radiation therapy allows conservation of the larynx without any effect on survival. Concurrent chemoradiotherapy provides high rates of laryngeal preservation (Lefebvre, 2006). Patients with complete response to chemotherapy have a higher probability of cure after hyperfractionation (radiation treatments given in smaller doses but more often than standard radiation therapy). Some tumors may be treated with hyperfractionated radiation therapy; however, this form of radiation therapy may have more severe short-term side effects (varying degrees of mucositis or inflammation of the mucous membranes) but fewer long-term side effects (Majem, Mesia, Mañós, et al., 2006).

For patients with more advanced disease, cisplatin-based chemotherapy plus radiation protocols have been used effectively. 5-Fluorouracil (5-FU) is also commonly used in the treatment of laryngeal squamous cell cancer. Patients and their physicians must carefully consider the various side effects and complications associated with the different treatment modalities (Tierney, et al., 2007).

The presence of lymph node involvement in the neck can affect the outcome. Supraglottic tumors metastasize early and bilaterally even when there appears to be no lymph node involvement at the time of diagnosis. When the neck is involved, the treatment includes surgery or chemoradiation or both (Tierney, et al., 2007).

Surgical Management

The overall goals for the patient undergoing surgical treatment include minimizing the effects of surgery on speech, swallowing, and breathing while maximizing the cure of the cancer. Several different curative procedures are available that can offer voice-sparing results while achieving a positive cure rate for the patient who has an early laryngeal carcinoma. Surgical options include (1) vocal cord stripping, (2) cordectomy, (3) laser surgery, (4) partial laryngectomy, or (5) total laryngectomy.

Vocal Cord Stripping

Stripping of the cord is used to treat dysplasia, hyperkeratosis, and leukoplakia and is often curative for these lesions. The procedure involves removal of the mucosa of the edge of the vocal cord, using an operating microscope. Early vocal cord lesions are initially treated with radiation therapy.

Cordectomy

Cordectomy, which is an excision of the vocal cord, is usually performed via transoral laser. This procedure is used for lesions limited to the middle third of the vocal cord. The resulting voice quality is related to the extent of tissue removed.

Laser Surgery

Laser microsurgery is well known to have several advantages for treatment of early glottic cancers. Treatment and recovery are shorter, with fewer side effects, and treatment may be less costly than for other forms of therapy (De Vita, et al., 2005). Microelectrodes are useful for surgical resection of smaller laryngeal carcinomas. The carbon dioxide (CO_2) laser can be used for the treatment of many laryngeal tumors, with the exception of large vascular tumors. When compared with the results of other treatments for early laryngeal cancer, laser microsurgery is considered to be the method of choice based on patient outcomes (Ambrosch, 2007).

Partial Laryngectomy

A partial laryngectomy (laryngofissure–thyrotomy) is often used for smaller cancers of the larynx. It is recommended in

the early stages of cancer in the glottic area when only one vocal cord is involved. The surgery is associated with a very high cure rate. It may also be performed for recurrence when high-dose radiation has failed. A portion of the larynx is removed, along with one vocal cord and the tumor; all other structures remain. The airway remains intact, and the patient is expected to have no difficulty swallowing. The voice quality may change, or the patient may sound hoarse.

Total Laryngectomy

Complete removal of the larynx (total **laryngectomy**) can provide the desired cure in most advanced laryngeal cancers, when the tumor extends beyond the vocal cords, or for cancer that recurs or persists after radiation therapy. In a total laryngectomy, the laryngeal structures are removed, including the hyoid bone, epiglottis, cricoid cartilage, and two or three rings of the trachea. The tongue, pharyngeal walls, and trachea are preserved. A total laryngectomy results in permanent loss of the voice and a change in the airway, requiring a permanent tracheostomy (Fig. 22-4). Occasionally, patients continue to have a laryngectomy tube in the stoma. Laryngectomy tubes are similar in appearance to tracheostomy tubes; however, a laryngectomy tube can be distinguished from a tracheostomy tube because the patient is unable to speak or breathe when the laryngectomy tube is occluded. Patients who have a total laryngectomy require alternatives to normal speech; these may include a prosthetic device, such as the Blom-Singer valve, to speak without aspirating.

Surgery is more difficult when the lesion involves the midline structures or both vocal cords. With or without neck dissection, a total laryngectomy requires a permanent tracheal stoma because the larynx that provides the protective sphincter is no longer present. The tracheal stoma prevents the aspiration of food and fluid into the lower respiratory tract. The patient has no voice but has normal swallowing. A total laryngectomy changes the manner in which airflow is used for breathing and speaking, as depicted in Figure 22-4. The patient has significant loss of the natural voice and the need to breathe through an opening (stoma) created in the lower neck. Complications that may occur include a salivary leak, wound infection from the development of a pharyngocutaneous fistula, stomal stenosis, and dysphagia secondary to esophageal stricture. Despite these changes and potential complications, many patients who have undergone a total laryngectomy maintain a good quality of life overall (Woodard, Oplatek & Petruzzelli, 2007). In some cases, the patient may be a candidate for a near-total laryngectomy. In this situation, the patient would be a candidate for chemotherapy and radiotherapy regimens postoperatively. Voice preservation can be achieved in most cases.

Advances in surgical techniques for treating laryngeal cancer may minimize the cosmetic and functional deficits previously seen with total laryngectomy. Some microlaryngeal surgery can be performed endoscopically.

Radiation Therapy

The goal of radiation therapy is to eradicate the cancer and preserve the function of the larynx. The decision to use radiation therapy is based on several factors, including the staging of the tumor and the patient's overall health status, lifestyle (including occupation), and personal preference. Excellent results have been achieved with radiation therapy in patients with early stage glottic tumors when only one vocal cord is involved and there is normal mobility of the cord (ie, with phonation), as well as in small supraglottic lesions. One of the benefits of radiation therapy is that patients retain a near-normal voice. A few may develop chondritis (inflammation of the cartilage) or stenosis; a small number may later require laryngectomy.

Radiation therapy may also be used preoperatively to reduce the tumor size. Radiation therapy is combined with surgery in advanced laryngeal cancer as adjunctive therapy to surgery or chemotherapy and as a palliative measure. A variety of clinical trials have combined chemotherapy and radiation therapy in the treatment of advanced laryngeal tumors.

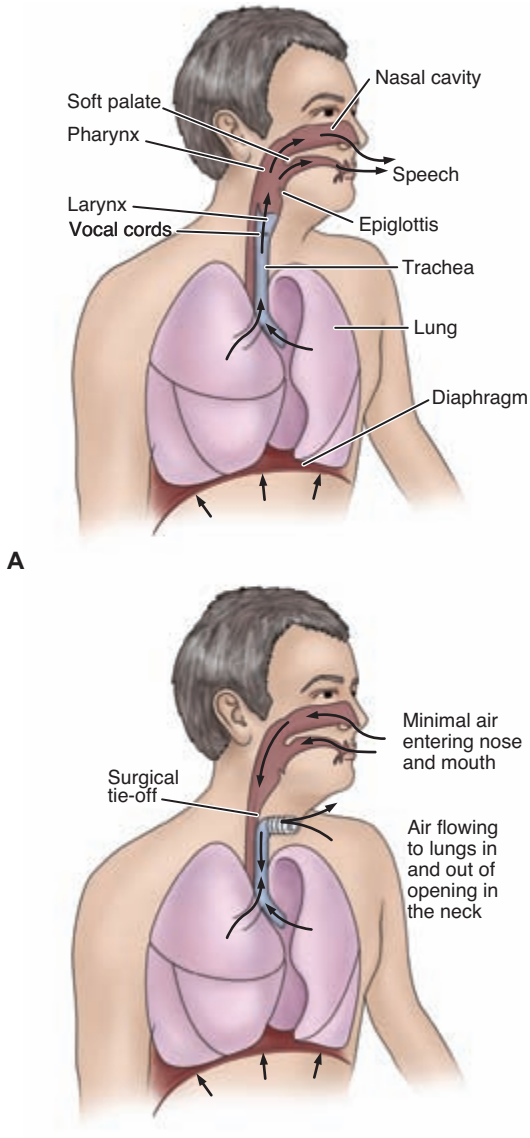

Figure 22-4 Total laryngectomy produces a change in airflow for breathing and speaking. **A,** Normal airflow. **B,** Airflow after total laryngectomy.

CHART 22-8 NURSING RESEARCH PROFILE

Speech Impairment After Surgery for Head and Neck Cancer

Rodriguez, C. S. & VanCott, M. L. (2005). Speech impairment in the postoperative head and neck cancer patient: Nurses' and patients' perceptions, *Qualitative Health Research, 15*(7), 897–911.

Purpose

Patients who undergo surgery for treatment of head and neck cancer are often unable to verbally communicate their needs in the immediate postoperative period. Furthermore, these patients have postoperative pain, and nurses caring for these patients need strategies to assess and manage the patients' pain. The purposes of this study were (1) to explore the experience of postoperative pain for the patient with head and neck cancer and speech impairment and (2) to explore strategies used by nurses to assess and manage pain related to head and neck cancer treatment in the immediate postoperative period.

Design

This qualitative study, which was part of a larger study that included quantitative and qualitative methods, used individual written interviews for nine patients following surgical treatment of head and neck cancer and individual interviews as well as a focus group of six nurses. Patients were asked about their pain and how they tried to describe the pain without the use of speech. Nurses were asked what strategies they used to measure pain in patients with pain and communication impairment and how they made decisions about pain management when the patient with head and neck cancer is unable to communicate. Interviews from both patients and nurses were analyzed to uncover patterns.

Findings

Two issues identified from the nurses' responses related to measuring pain and decision making about pain management. Nurses identified use of a systematic approach in measuring postoperative pain in patients with head and neck cancer, including use of questions and observation of vital signs and patient behaviors to assess the presence and severity of pain. They reported asking patients directly about the presence of pain and described the importance of giving patients time to express their needs. Decision making for nurses was based on the need to relieve the patient's pain level to promote healing and recovery.

Patients described the challenge of trying to communicate their pain with a speech impairment and the strategies that they found useful in trying to convey information about their pain to others. They used nonverbal methods (gestures, pointing to painful area, grimacing) and a pain intensity scale to indicate the presence and severity of the pain. They reported the need to be persistent in communicating pain, especially when moved from the critical care area to a general medical-surgical unit.

Both nurses and patients expressed frustration about the pain experience. Patients were more likely to report an inability to express themselves, and nurses were more likely to report problems in adequately assessing pain.

Nursing Implications

Strategies for assessment and management of pain following head and neck surgery for treatment of cancer should be established prior to surgery. These approaches should be developed both by nurses and patients, and strategies should address not only the immediate postoperative period spent in critical care units, but also medical-surgical units, where there are fewer nurses caring for patients than in specialized units. Methods of communication must be established for patients out of the immediate view of nurses because patients are unable to summon assistance through an intercom system. Advanced planning that targets effective assessment and management of postoperative pain is more likely to reduce the frustrations experienced by patients and nurses and result in more effective pain management.

Advances in research and treatment of these tumors with surgery, chemotherapy, and radiation therapy have improved outcomes and decreased the incidence of posttreatment morbidities (De Vita, et al., 2005). Radiation therapy combined with chemotherapy may be an alternative to a total laryngectomy.

Complications from radiation therapy are a result of external radiation to the head and neck area, which may also include the parotid gland, which is responsible for mucus production. Symptoms may include acute mucositis, ulceration of the mucous membranes, pain, **xerostomia** (dry mouth), loss of taste, dysphasia, fatigue, and skin reactions. Later complications may include laryngeal necrosis, edema, and fibrosis.

Speech Therapy

The patient who undergoes a laryngectomy and the patient's family face potentially complex challenges, including significant changes in the ability to communicate. To minimize anxiety and frustration on the part of the patient and family, it is necessary to discuss the loss or alteration of speech with them. To plan postoperative communication strategies and speech therapy, the speech therapist or pathologist conducts a preoperative evaluation. During this time, the nurse discusses with the patient and family methods of communication that will be available in the immediate postoperative period. These include writing, lip speaking and reading, and communication or word boards (Chart 22-8). A system of communication is established with the patient, family, nurse, and physician and is implemented consistently after surgery.

In addition, a long-term postoperative communication plan for **alaryngeal communication** is developed. The three most common techniques of alaryngeal communication are esophageal speech, artificial larynx (electrolarynx), and tracheoesophageal puncture. Training in these techniques begins once medical clearance is obtained from the physician.

Esophageal Speech

Esophageal speech was the primary method of alaryngeal speech taught to patients until the 1980s. The patient needs the ability to compress air into the esophagus and expel it,

setting off a vibration of the pharyngeal esophageal segment. The technique can be taught once the patient begins oral feedings, approximately 1 week after surgery. First, the patient learns to belch and is reminded to do so an hour after eating. Then the technique is practiced repeatedly. Later, this conscious belching action is transformed into simple explosions of air from the esophagus for speech purposes. The speech therapist continues to work with the patient to make speech intelligible and as close to normal as possible. Because it takes a long time to become proficient, the success rate is low.

Electric Larynx

If esophageal speech is not successful, or until the patient masters the technique, an electric larynx may be used for communication. This battery-powered apparatus projects sound into the oral cavity. When the mouth forms words (articulation), the sounds from the electric larynx become audible words. The voice that is produced sounds mechanical, and some words may be difficult to understand. The advantage is that the patient is able to communicate with relative ease while working to become proficient at either esophageal or tracheoesophageal puncture speech.

Tracheoesophageal Puncture

The third technique of alaryngeal speech is tracheoesophageal puncture (Fig. 22-5). This technique for voice restoration is simple and has few complications. It is associated with high phonation success, good phonation quality, and steady long-term results. This technique is widely used because the speech associated with it most resembles normal speech (the sound produced is a combination of esophageal speech and voice), and it is easily learned. A valve is placed in the tracheal stoma to divert air into the esophagus and out the mouth. Once the puncture is surgically created and has healed, a voice prosthesis (Blom-Singer) is fitted over the puncture site. A speech therapist teaches the patient how to produce sounds. Moving the tongue and lips to form the sound into words produces speech as before. To prevent airway obstruction, the prosthesis is removed and cleaned when mucus builds up.

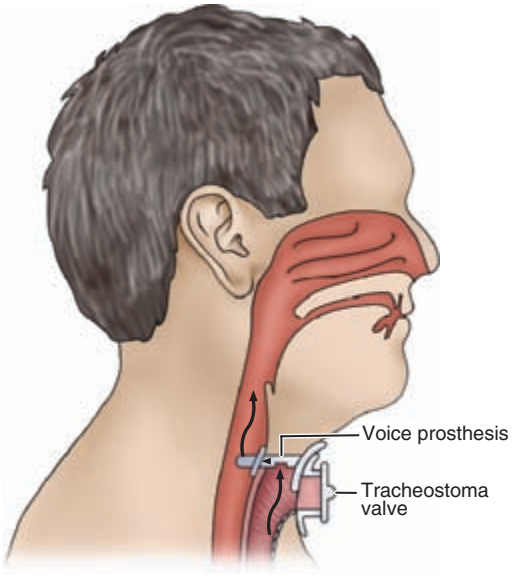

Figure 22-5 Schematic representation of tracheoesophageal puncture speech. Air travels from the lung through a puncture in the posterior wall of the trachea into the esophagus and out the mouth. A voice prosthesis is fitted over the puncture site.

The success of these various approaches to preserve or restore speech varies. Tracheoesophageal puncture is recommended in patients without previous radiation therapy since success rates decline for patients who have had previous radiation therapy (Kummer, Chahoud, Schuster, et al., 2006).

NURSING PROCESS

The Patient Undergoing Laryngectomy

Assessment

The nurse obtains a health history and assesses the patient's physical, psychosocial, and spiritual domains. The health history addresses the following symptoms: hoarseness, sore throat, dyspnea, dysphagia, and pain or burning in the throat. The physical assessment includes a thorough head and neck examination with an emphasis on the patient's airway. In addition, the neck and thyroid are palpated for swelling, nodularity, or adenopathy.

The nurse also assesses the patient's general state of nutrition, including height and weight and body mass index and reviews laboratory values that assist in determining the patient's nutritional status (albumin, protein, glucose, and electrolyte levels). If treatment includes surgery, the nurse must know the nature of the surgery to plan appropriate care. If the patient is expected to have no voice as a result of the surgical procedure, a preoperative evaluation by the speech therapist is essential. The patient's ability to hear, see, read, and write is assessed. Visual impairment and functional illiteracy may create additional problems with communication and may require creative approaches to ensure that the patient is able to communicate any needs. Because alcohol abuse is a risk factor for cancer of the larynx, it is essential to assess the patient's pattern of alcohol intake. Patients who are accustomed to daily consumption of alcohol are at risk for alcohol withdrawal syndrome (delirium tremens) when alcohol intake is stopped suddenly.

In addition, the nurse assesses the psychological readiness of the patient and family (Chart 22-9). The thought of having cancer is frightening to most people. Fear is compounded by the possibility of permanent voice loss and, in some cases, some degree of disfigurement. The nurse evaluates the patient's and family's knowledge of the planned surgical procedure and expected postoperative course and assesses the patient's and family's coping methods and support systems. The nurse assesses the patient's spirituality needs based on the patient's individual preferences, beliefs, and culture.

Diagnosis

Nursing Diagnoses

Based on all the assessment data, major nursing diagnoses may include the following:

- Deficient knowledge about the surgical procedure and postoperative course

CHART 22-9

Ethics and Related Issues

Situation

You are the nurse working the morning shift on a medical-surgical unit at your local hospital. You are caring for an elderly 82-year-old man with a new diagnosis of advanced stage IV cancer of the larynx. The surgeon has determined that this patient needs to undergo a total laryngectomy for better control of the disease. Although the patient continues to live at home, he has early signs of senile dementia along with significant weight loss; he is quite debilitated and frail. He has a history of tobacco abuse and continues to smoke one pack of cigarettes per day. He is a widow with two living children: one daughter and one son. Because of his dementia, the patient is not able to sign consent for his total laryngectomy. The patient's daughter has informed the surgeon that she will not agree to sign surgical consent for a total laryngectomy. She is very concerned about the possible outcome of the surgery and has informed you that she knows for certain that her father would not want this surgery and would want to live at home and not in a nursing home facility. The daughter has asked to speak with you regarding her concerns. The patient's son is in agreement with the recommendation for a total laryngectomy and would be willing to sign surgical consent, but he lives out of state and cannot travel at this time. He is estranged from his sister. The patient does not have a designated health care surrogate or power of attorney.

Dilemma

This patient has been diagnosed with a life-threatening illness and needs surgical intervention for control of the disease. He is unable to make medical decisions due to his dementia, and therefore it is now the responsibility of his children in the absence of a spouse to function as his health care surrogate. Based on his physical appearance and condition, he appears to be unable to care for himself. His children are not in agreement regarding the recommended treatment plan. This poses an ethical dilemma that must be resolved so that the patient can receive adequate and timely treatment for his illness and appropriate physical, psychological, and home care should he undergo this procedure.

Discussion

1. Based on the above scenario, what further assessment of the patient's physical and psychosocial condition is needed prior to his surgery and why?
2. What is the relevance for evaluation of the patient's home environment in relation to his need for total laryngectomy?
3. You need to reinforce the education given by the surgeon to the patient's daughter and son regarding the possible complications of a total laryngectomy. Briefly discuss each complication as you would with the patient's daughter and son.
4. What other health care resources should be consulted given the above scenario?
5. Given the patient's dementia, would it be reasonable to communicate to him the plan of care and education about the recommended treatment and possible side effects?

- Anxiety and depression related to the diagnosis of cancer and impending surgery
- Ineffective airway clearance related to excess mucus production secondary to surgical alterations in the airway
- Impaired verbal communication related to anatomic deficit secondary to removal of the larynx and to edema
- Imbalanced nutrition: less than body requirements, related to inability to ingest food secondary to swallowing difficulties
- Disturbed body image and low self-esteem secondary to major neck surgery, change in appearance, and altered structure and function
- Self-care deficit related to pain, weakness, fatigue, musculoskeletal impairment related to surgical procedure and postoperative course

Collaborative Problems/Potential Complications

Based on assessment data, potential complications that may develop include the following:

- Respiratory distress (hypoxia, airway obstruction, tracheal edema)
- Hemorrhage, infection, and wound breakdown
- Aspiration
- Tracheostomal stenosis

Planning and Goals

The major goals for the patient may include attainment of an adequate level of knowledge, reduction in anxiety, maintenance of a patent airway (patient is able to handle own secretions), effective use of alternative means of communication, attainment of optimal levels of nutrition and hydration, improvement in body image and self-esteem, improved self-care management, and absence of complications.

Nursing Interventions

Teaching the Patient Preoperatively

The diagnosis of laryngeal cancer often produces misconceptions and fears. Many people assume that loss of speech and disfigurement are inevitable with this condition. Once the physician explains the diagnosis and discusses treatment options with the patient and family, the nurse clarifies any misconceptions by identifying the location of the larynx, its function, the nature of the planned surgical procedure, and its effect on speech. Further, the patient's ability to sing, laugh, and whistle will be lost. Informational materials (written and audiovisual) about the surgery are given to the patient and family for review and reinforcement. If a complete laryngectomy is planned, the patient must understand that the natural voice will be lost, but that special training can provide a means for communicating. The patient needs to know that until training is started, communication will be possible by using the call light, by writing, or by using a special communication board. The interdisciplinary team conducts an initial assessment of the patient and family. In addition to the nurse in charge of the patient's care and the physician, the team might include an advanced practice nurse or nurse practitioner, speech therapist, respiratory therapist, social worker, dietitian, and home care nurse. The

services of a spiritual advisor are made available to the patient and family, as appropriate.

The nurse also reviews equipment and treatments for postoperative care with the patient and family, teaches important coughing and deep-breathing exercises, and helps the patient perform return demonstrations. The nurse clarifies the patient's role in the postoperative and rehabilitation periods. The family's needs must also be addressed because family members are often responsible for complex care of the patient in the home.

Reducing Anxiety and Depression

Because surgery of the larynx is performed most often for a malignant tumor, the patient may have many questions: Will the surgeon be able to remove all of the tumor? Is it cancer? Will I die? Will I choke? Will I suffocate? Will I ever speak again? What will I look like? Because of these and other questions, the psychological preparation of the patient is as important as the physical preparation.

Any patient undergoing surgery may have many fears. In laryngeal surgery, these fears may relate to the diagnosis of cancer and the possibility of permanent loss of the voice and disfigurement. The nurse provides the patient and family with opportunities to ask questions, verbalize feelings, and discuss perceptions. The nurse should address any questions and misconceptions the patient and family have. During the preoperative or postoperative period, a visit from someone who has had a laryngectomy may reassure the patient that people are available to assist and that rehabilitation is possible.

In the immediate postoperative period, the nurse attempts to spend uninterrupted time with the patient that is focused on building trust and reducing the patient's anxiety. Active listening provides an environment that promotes open communication and allows the patient to verbalize feelings. Clear instructions and explanations are given to the patient and family in a calm, reassuring manner. The nurse listens attentively, encourages the patient, and identifies and reduces environmental stressors. The nurse seeks to learn from the patient what activities promote feelings of comfort and assists the patient in such activities (eg, listening to music, reading). Relaxation techniques such as guided imagery and meditation are often helpful. The nurse remains with the patient during episodes of severe anxiety and includes the patient in decision making. To support the family, it may be necessary to allow extra visiting periods.

Maintaining a Patent Airway

The nurse promotes a patent airway by positioning the patient in the semi-Fowler's or Fowler's position after recovery from anesthesia. This position decreases surgical edema and promotes lung expansion. Observing the patient for restlessness, labored breathing, apprehension, and increased pulse rate helps identify possible respiratory or circulatory problems. The nurse assesses the patient's lung sounds and reports changes that may indicate impending complications. Medications that depress respiration, particularly opioids, should be used cautiously. However, adequate use of analgesic medications is essential for pain relief because postoperative pain can result in shallow breathing and an ineffective cough. The nurse encourages the patient to turn, cough, and take deep breaths. If necessary, suctioning may be performed to remove secretions, but disruption of suture lines must be avoided. The nurse also encourages and assists the patient with early ambulation to prevent atelectasis, pneumonia, and deep vein thrombosis. Pulse oximetry is used to monitor the patient's oxygen saturation level.

If a total laryngectomy was performed, a laryngectomy tube will most likely be in place. In some instances a laryngectomy tube is not used; in others it is used temporarily; and in many it is used permanently. The laryngectomy tube, which is shorter than a tracheostomy tube but has a larger diameter, is the patient's only airway. The care of this tube is similar to that for a tracheostomy tube (see Chapter 25). The nurse changes the inner cannula (if present) every 8 hours if it is disposable. Although nondisposable tubes are used infrequently, if one is used, the nurse cleans the inner cannula every 4 to 6 hours or more often as needed. It should be replaced within 30 to 60 minutes after removal (Schiech, 2007). If a tracheostomy tube without an inner cannula is used, humidification and suctioning of this tube are essential to prevent formation of mucous plugs. If a T-shaped laryngectomy tube is used, both sides of the T-tube should be suctioned to prevent obstruction due to copious secretions. The nurse should also use secure tracheostomy ties to prevent tube dislodgement. The nurse cleans the stoma daily with soap and water or another prescribed solution and a soft cloth or gauze, taking care to prevent water and soap or solution from entering the stoma (Schiech, 2007). If a non–oil-based antibiotic ointment is prescribed, it is applied around the stoma and suture line. If crusting appears around the stoma, the crusts are removed with sterile tweezers and additional ointment is applied.

Wound drains, inserted during surgery, may be in place to assist in removal of fluid and air from the surgical site. Suction also may be used, but cautiously, to avoid trauma to the surgical site and incision. The nurse observes, measures, and records drainage. When drainage is less than 30 mL/day for 2 consecutive days, the physician usually removes the drains.

Frequently, the patient coughs up large amounts of mucus through this opening. Because air passes directly into the trachea without being warmed and moistened by the upper respiratory mucosa, the tracheobronchial tree compensates by secreting excessive amounts of mucus. Therefore, the patient has frequent coughing episodes and may develop a brassy-sounding, mucus-producing cough. The nurse reassures the patient that these problems will diminish in time, as the tracheobronchial mucosa adapts to the altered physiology.

After the patient coughs, the tracheostomy opening must be wiped clean and clear of mucus. A simple gauze dressing, washcloth, or even paper towel (because of its size and absorbency) worn below the tracheostomy may serve as a barrier to protect the clothing from the copious mucus that the patient may initially expel.

One of the most important factors in decreasing cough, mucus production, and crusting around the stoma is adequate humidification of the environment. Mechanical humidifiers and aerosol generators (nebulizers) increase the humidity and are important for the patient's comfort. The laryngectomy tube may be removed when the stoma is well healed, within 3 to 6 weeks after surgery. The nurse teaches the patient how to clean and change the tube (see Chapter 25) and remove secretions.

Promoting Alternative Communication Methods

Establishing an effective means of communication is usually the ultimate goal in the rehabilitation of the laryngectomy patient. To understand and anticipate the patient's postoperative needs, the nurse works with the patient, speech therapist, and family to encourage use of alternative communication methods. These means of communication are established preoperatively and must be used consistently by all personnel who come in contact with the patient postoperatively. The patient is now unable to use an intercom system. A call bell or hand bell must be placed within easy reach of the patient. A Magic Slate is often used for communication, and the nurse documents which hand the patient uses for writing so that the opposite arm can be used for IV infusions. (To ensure the patient's privacy, the nurse discards notes used for communication.) If the patient cannot write, a picture-word-phrase board or hand signals can be used.

Writing everything or communicating through gestures can be very time-consuming and frustrating. The patient must be given adequate time to communicate his or her needs. The patient may become impatient and angry when not understood.

Promoting Adequate Nutrition and Hydration

Postoperatively, the patient may not be permitted to eat or drink for several days. Alternative sources of nutrition and hydration include IV fluids, enteral feedings through a nasogastric or gastrostomy tube, and parenteral nutrition.

When the patient is ready to start oral feedings, a speech therapist or radiologist may conduct a swallow study (a video fluoroscopy radiology procedure) to evaluate the patient's risk of aspiration. Once the patient is cleared for oral feedings, the nurse explains that thick liquids will be used first because they are easy to swallow. Different swallowing maneuvers are attempted with various food consistencies. Once the patient is cleared for food intake, the nurse stays with the patient during initial oral feedings and keeps a suction setup at the bedside for needed suctioning. The nurse instructs the patient to avoid sweet foods, which increase salivation and suppress the appetite. Solid foods are introduced as tolerated. The patient is instructed to rinse the mouth with warm water or mouthwash after oral feedings and to brush the teeth frequently.

Because taste and smell are so closely related, taste sensations are altered for a while after surgery because inhaled air passes directly into the trachea, bypassing the nose and the olfactory end organs. In time, however, the patient usually accommodates to this change and olfactory sensation adapts, often with return of interest in eating. The nurse observes the patient for any difficulty in swallowing, particularly when eating resumes, and reports its occurrence to the physician.

The patient's weight and laboratory data are monitored to ensure that nutritional and fluid intake are adequate. In addition, skin turgor and vital signs are assessed for signs of decreased fluid volume.

Promoting Positive Body Image and Self-Esteem

Disfiguring surgery and an altered communication pattern are threats to a patient's body image and self-esteem. The reaction of family members and friends is a major concern for the patient. The nurse encourages the patient to express feelings about the changes brought about by surgery, particularly feelings related to fear, anger, depression, and isolation. Encouraging use of previous effective coping strategies may be helpful. Referral to a support group, such as International Association of Laryngectomees (IAL), WebWhispers, and I Can Cope (through the American Cancer Society) may help the patient and family deal with the changes in their lives. Contact information for these support groups can be found at the end of the chapter.

Promoting Self-Care Management

A positive approach along with promotion of self-care activities are important when caring for the patient. The patient should begin participating in self-care activities as soon as possible. The nurse assesses the patient's readiness for decision making and encourages the patient to participate actively in performing care. The nurse provides positive reinforcement when the patient makes an effort in self-care. The nurse needs to be a good listener and a support to the family, especially when explaining the tubes, dressings, and drains that are in place postoperatively.

In addition to its work through support groups, the IAL encourages an exchange of ideas and methods for learning and teaching alaryngeal methods of communication. It also works to promote employers' understanding about cancer of the larynx and to enable patients to retain or obtain employment after surgery.

Monitoring and Managing Potential Complications

The potential complications after laryngectomy include respiratory distress and hypoxia, hemorrhage, infection, wound breakdown, aspiration, and tracheostomal stenosis.

RESPIRATORY DISTRESS AND HYPOXIA. The nurse monitors the patient for signs and symptoms of respiratory distress and hypoxia, particularly restlessness, irritation, agitation, confusion, tachypnea, use of accessory muscles, and decreased oxygen saturation on pulse oximetry (SpO_2). Any change in respiratory status requires immediate intervention. Hypoxia may cause restlessness and an initial rise in blood pressure; this is followed by hypotension and somnolence. Cyanosis is a late sign of hypoxia. Obstruction needs to be ruled out immediately by suctioning and by having the patient cough and breathe deeply. Hypoxia and airway obstruction, if not immediately treated, are life-threatening.

Other nursing measures include repositioning of the patient to ensure an open airway and administering oxygen as prescribed and used with caution in patients with chronic obstructive pulmonary disease. The nurse should always be prepared for possible intubation and mechanical ventilation. The nurse must be knowledgeable about the hospital's emergency code protocols and skilled in use of emergency equipment. The nurse must remain with the patient at all times during respiratory distress. The emergency call bell and telephone should be used to initiate a code, call for further assistance, and summon the physician immediately if nursing measures do not improve the patient's respiratory status.

HEMORRHAGE. Bleeding from the drains at the surgical site or with tracheal suctioning may signal the occurrence of

hemorrhage. The nurse promptly notifies the surgeon of any active bleeding, which can occur at a variety of sites, including the surgical site, drains, and trachea. Rupture of the carotid artery is especially dangerous. Should this occur, the nurse must apply direct pressure over the artery, summon assistance, and provide emotional support to the patient until the vessel is ligated. The nurse monitors vital signs for changes, particularly increased pulse rate, decreased blood pressure, and rapid deep respirations. Cold, clammy, pale skin may indicate active bleeding. IV fluids and blood components may be administered and other measures implemented to prevent or treat hemorrhagic shock. Management of the patient with shock is discussed in detail in Chapter 15.

INFECTION. The nurse monitors the patient for signs of postoperative infection. These include an increase in temperature and pulse, a change in the type of wound drainage, and increased areas of redness or tenderness at the surgical site. Other signs include purulent drainage, odor, and increased wound drainage. The nurse monitors the patient's white blood cell (WBC) count; a rise in WBCs may indicate the body's effort to combat infection. In elderly patients, infection can be present without an increase in the patient's WBC count; therefore, the nurse must monitor the patient for more subtle signs. WBCs are suppressed in the patient with decreased immune function (eg, patients with HIV infection, or those receiving chemotherapy or radiation therapy); this predisposes the patient to a severe infection and sepsis. Antimicrobial (antibiotic) medications must be administered as scheduled. All suspicious drainage is cultured, and the patient may be placed in isolation as indicated. Strategies are implemented to minimize the exposure of the patient to micro-organisms and their spread to others. The nurse reports any significant change in the patient's status to the surgeon.

WOUND BREAKDOWN. Wound breakdown caused by infection, poor wound healing, development of a fistula, radiation therapy, or tumor growth can create a life-threatening emergency. The carotid artery, which is close to the stoma, may rupture from erosion if the wound does not heal properly. The nurse observes the stoma area for wound breakdown, hematoma, and bleeding and reports their occurrence to the surgeon. If wound breakdown occurs, the patient must be monitored carefully and identified as at high risk for carotid hemorrhage.

ASPIRATION. The patient who has undergone a laryngectomy is at risk for aspiration and aspiration pneumonia due to depressed cough, the sedating effects of anesthetic and analgesic medications, alteration in the airway, impaired swallowing, and the administration of tube feedings. The nurse assesses for the presence of nausea and administers antiemetic medications, as prescribed. The nurse keeps a suction setup available in the hospital and instructs the family to do so at home for use if needed. Patients receiving tube feedings are positioned with the head of the bed at 30 degrees or higher during feedings and for 30 to 45 minutes after tube feedings. Patients receiving oral feedings are positioned with the head of the bed in an upright position for 30 to 45 minutes after feedings. For patients with a nasogastric or gastrostomy tube, the placement of the tube and residual gastric volume must be checked before each feeding. High amounts of residual volume (greater than 50% of previous intake) indicate delayed gastric emptying; this can lead to reflux and aspiration. Signs or symptoms of aspiration are reported to the physician immediately.

TRACHEOSTOMAL STENOSIS. Tracheostomal stenosis is an abnormal narrowing of the trachea or the tracheostomy stoma. Infection at the stoma site, excessive traction on the tracheostomy tube by the connecting tubing, and persistent high tracheostomy cuff pressure are risk factors for tracheostomal stenosis. The incidence of this condition varies widely, and it is often preventable. The nurse assesses the patient's stoma for signs and symptoms of infection and reports any evidence of this to the physician immediately. Tracheostomy care is performed routinely. The nurse assesses the connecting tubing (eg, ventilation tubing) and secures the tubing to avoid excessive traction on the patient's tracheostomy. The nurse ensures that the tracheostomy cuff is deflated (for a patient with a cuffed tube) except for short periods, such as when the patient is eating or taking medications.

Promoting Home and Community-Based Care

TEACHING PATIENTS SELF-CARE. The nurse has an important role in the recovery and rehabilitation of the patient who has had a laryngectomy. In an effort to facilitate the patient's ability to manage self-care, discharge instruction begins as soon as the patient is able to participate. Nursing care and patient teaching in the hospital, outpatient setting, and rehabilitation or long-term care facility must take into consideration the many emotions, physical changes, and lifestyle changes experienced by the patient. In preparing the patient to go home, the nurse assesses the patient's readiness to learn and the level of knowledge about self-care management. The nurse also reassures the patient and family that most self-care management strategies can be mastered. The patient needs to learn a variety of self-care behaviors, including tracheostomy and stoma care, wound care, and oral hygiene. The nurse also instructs the patient about the need for adequate dietary intake, safe hygiene, and recreational activities.

Tracheostomy and Stoma Care. The nurse provides specific instructions to the patient and family about what to expect with a tracheostomy and its management. The nurse teaches the patient and caregiver to perform suctioning and emergency measures and tracheostomy and stoma care. The nurse stresses the importance of humidification at home and instructs the family to obtain and set up a humidification system before the patient returns home. In addition, the nurse cautions the patient and family that air-conditioned air may be too cool or too dry, and therefore irritating for the patient with a new laryngectomy. (See Chapter 25 for details about tracheostomy care.)

Hygiene and Safety Measures. The nurse instructs the patient and family about safety precautions that are needed because of the changes in structure and function resulting from the surgery. Special precautions are needed in the

CHART 22-10 HOME CARE CHECKLIST

The Patient With a Laryngectomy

At the completion of the home care instruction, the patient or caregiver will be able to:	PATIENT	CAREGIVER
• Demonstrate methods to clear the airway and handle secretions	✔	✔
• Explain the rationale for maintaining adequate humidification with a humidifier or nebulizer	✔	✔
• Demonstrate how to clean the skin around the stoma and how to use ointments and tweezers to remove encrustations	✔	✔
• State the rationale for wearing a loose-fitting protective cloth at the stoma	✔	✔
• Discuss the need to avoid cold air from air conditioning and the environment to prevent irritation of the airway	✔	✔
• Demonstrate safe technique in changing the laryngectomy/tracheostomy tube	✔	✔
• Identify the signs and symptoms of wound infection and state what to do about them	✔	✔
• Describe safety or emergency measures to implement in case of breathing difficulty or bleeding	✔	✔
• State the rationale for wearing or carrying special medical identification and ways to obtain help in an emergency	✔	✔
• Explain the importance of covering the stoma when showering or bathing	✔	✔
• Identify fluid and caloric needs	✔	✔
• Describe mouth care and discuss its importance	✔	✔
• Demonstrate alternative communication methods	✔	
• Identify support groups and agency resources	✔	✔
• State the need for regular checkups and reporting of any problems immediately	✔	✔

shower to prevent water from entering the stoma. Wearing a loose-fitting plastic bib over the tracheostomy or simply holding a hand over the opening is effective. Swimming is not recommended because a person with a laryngectomy can drown without submerging his or her face. Barbers and beauticians need to be alerted so that hair sprays, loose hair, and powder do not get near the stoma, because they can block or irritate the trachea and possibly cause infection. These self-care points are summarized in Chart 22-10.

The nurse teaches the patient and caregiver the signs and symptoms of infection and identifies indications that require contacting the physician after discharge. A discussion regarding cleanliness and infection control behaviors is essential in the education of the patient. The nurse teaches the patient and family to wash their hands before and after caring for the tracheostomy, to use tissue to remove mucus, and to dispose of soiled dressings and equipment properly. If the patient's surgery included cervical lymph node dissection, the nurse teaches the patient exercises for strengthening the shoulder and neck muscles.

Recreation and exercise are important for the patient's well-being and quality of life, and all but very strenuous exercise can be enjoyed safely. Avoidance of strenuous exercise and fatigue is important because the patient will have more difficulty speaking when tired, which can be discouraging. Additional safety points to address include the need for the patient to wear or carry medical identification, such as a bracelet or card, to alert medical personnel to the special requirements for resuscitation should this need arise. If resuscitation is needed, direct mouth-to-stoma ventilation should be performed. For home emergency situations, prerecorded emergency messages for police, the fire department, or other rescue services can be kept near the phone to be used quickly.

The nurse instructs and encourages the patient to perform oral care on a regular basis to prevent halitosis and infection. If the patient is receiving radiation therapy, synthetic saliva may be required because of decreased saliva production. The nurse instructs the patient to drink water or sugar-free liquids throughout the day and to use a humidifier at home. Brushing the teeth or dentures and rinsing the mouth several times a day will assist in maintaining proper oral hygiene.

CONTINUING CARE. Referral for home care is an important aspect of postoperative care for the patient who has had a laryngectomy and will assist the patient and family in the transition to the home. The home care nurse assesses the patient's general health status and the ability of the patient and family to care for the stoma and tracheostomy. The nurse assesses the surgical incisions, nutritional and respiratory status, and adequacy of pain management. The nurse assesses for signs and symptoms of complications and the patient's and family's knowledge of signs and symptoms to be reported to the physician. During the home visit, the nurse identifies and addresses other learning needs and concerns of the patient and family, such as adaptation to physical, lifestyle, and functional changes, as well as the patient's progress with learning and using new communication strategies. The nurse

assesses the patient's psychological status as well. The home care nurse reinforces previous teaching and provides reassurance and support to the patient and family caregivers as needed.

It is important that the person who has had a laryngectomy have regular physical examinations and seek advice concerning any problems related to recovery and rehabilitation. The nurse also reminds the patient to participate in health promotion activities and health screening and about the importance of keeping scheduled appointments with the physician, speech therapist, and other health care providers.

Evaluation

Expected Patient Outcomes

Expected patient outcomes may include the following:

1. Demonstrates an adequate level of knowledge, verbalizing an understanding of the surgical procedure and performing self-care adequately
2. Demonstrates less anxiety and depression
   a. Expresses a sense of hope
   b. Is aware of available community organizations and agencies that provide patient education and support groups
   c. Participates in support group for people with a laryngectomy
3. Maintains a clear airway and handles own secretions; also demonstrates practical, safe, and correct technique for cleaning and changing the tracheostomy or laryngectomy tube
4. Acquires effective communication techniques
   a. Uses assistive devices and strategies for communication (Magic Slate, call bell, picture board, sign language, speech reading, computer aids)
   b. Follows the recommendations of the speech therapist
   c. Demonstrates ability to communicate with new communication strategy
   d. Reports availability of prerecorded messages to summon emergency assistance by telephone
5. Maintains adequate nutrition and adequate fluid intake
6. Exhibits improved body image, self-esteem, and self-concept
   a. Expresses feelings and concerns
   b. Participates in self-care and decision making
   c. Accepts information about support group
7. Adheres to rehabilitation and home care program
   a. Practices recommended speech therapy
   b. Demonstrates proper methods for caring for stoma and laryngectomy or tracheostomy tube (if present)
   c. Verbalizes understanding of symptoms that require medical attention
   d. States safety measures to take in emergencies
   e. Performs oral hygiene as prescribed
8. Absence of complications
   a. Demonstrates a patent airway
   b. No bleeding from surgical site and minimal bleeding from drains; vital signs (blood pressure, temperature, pulse, respiratory rate) are normal
   c. No redness, tenderness, or purulent drainage at surgical site
   d. No wound breakdown
   e. Clear breath sounds; oxygen saturation level within acceptable range; chest x-ray clear
   f. No indications of infection, stenosis, or obstruction of tracheal stoma

CRITICAL THINKING EXERCISES

1 A 20-year-old male college student comes to the student health clinic with complaints of a sore throat and a fever lasting more than 12 days. Your physical assessment reveals a fiery-red pharyngeal membrane and tonsils with white-purple exudates and a scarlatina-form rash on the chest, abdomen, and axilla. What diagnostic tests and treatment would you anticipate for this patient? What teaching is needed to ensure that he complies with the treatment plan? What additional nursing measures would be indicated for this patient if he indicates that he is opposed to use of all medications because of his cultural and religious beliefs?

2 You are working in a sleep apnea clinic. A man has been referred to the clinic for testing. What risk factors for obstructive sleep apnea (OSA) will your health history focus on? What are the common signs and symptoms of OSA? What diagnostic tool is used to diagnose sleep apnea and how would you explain the diagnostic procedure to the patient? Once the diagnosis of OSA is confirmed, continuous positive airway pressure (CPAP) is prescribed. What instructions would you provide about CPAP? How would you modify your teaching if the patient does not speak English? If he is blind?

EBP **3** You are with your family at a company picnic and you see that a coworker is grasping her throat and is unable to speak or cough. You suspect that she is choking. You know that the abdominal thrust is used to remove a foreign object from a conscious adult who is choking. Briefly describe what you would do in this situation. What is the evidence base for your actions? How would you determine the strength of the evidence on which your actions are based?

EBP **4** You are the home health nurse for a female patient who has undergone a total laryngectomy for the treatment of cancer of the larynx. You are responsible to provide patient education regarding tracheostomy care and gastric tube feedings. The overall plan is for the patient to begin to assume responsibility for her own care and to consider speech therapy, but the patient and her husband believe she is not yet ready to do so. What are your priorities in terms of assessment of this patient? What is your plan to address the patient's fear, anxiety, communication, and nutrition needs? What is the evidence base for your actions in response to the patient's fear, anxiety, communication, and nutritional needs? How would you assess the strength of the evidence on which your actions are based?

The Smeltzer suite offers these additional resources to enhance learning and facilitate understanding of this chapter:

- thePoint on line resource, thepoint.lww.com/Smeltzer12E
- Student CD-ROM included with the book
- *Study Guide to Accompany Brunner & Suddarth's Textbook of Medical-Surgical Nursing*
- *Handbook for Brunner & Suddarth's Textbook of Medical-Surgical Nursing*

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