

UNIT 2

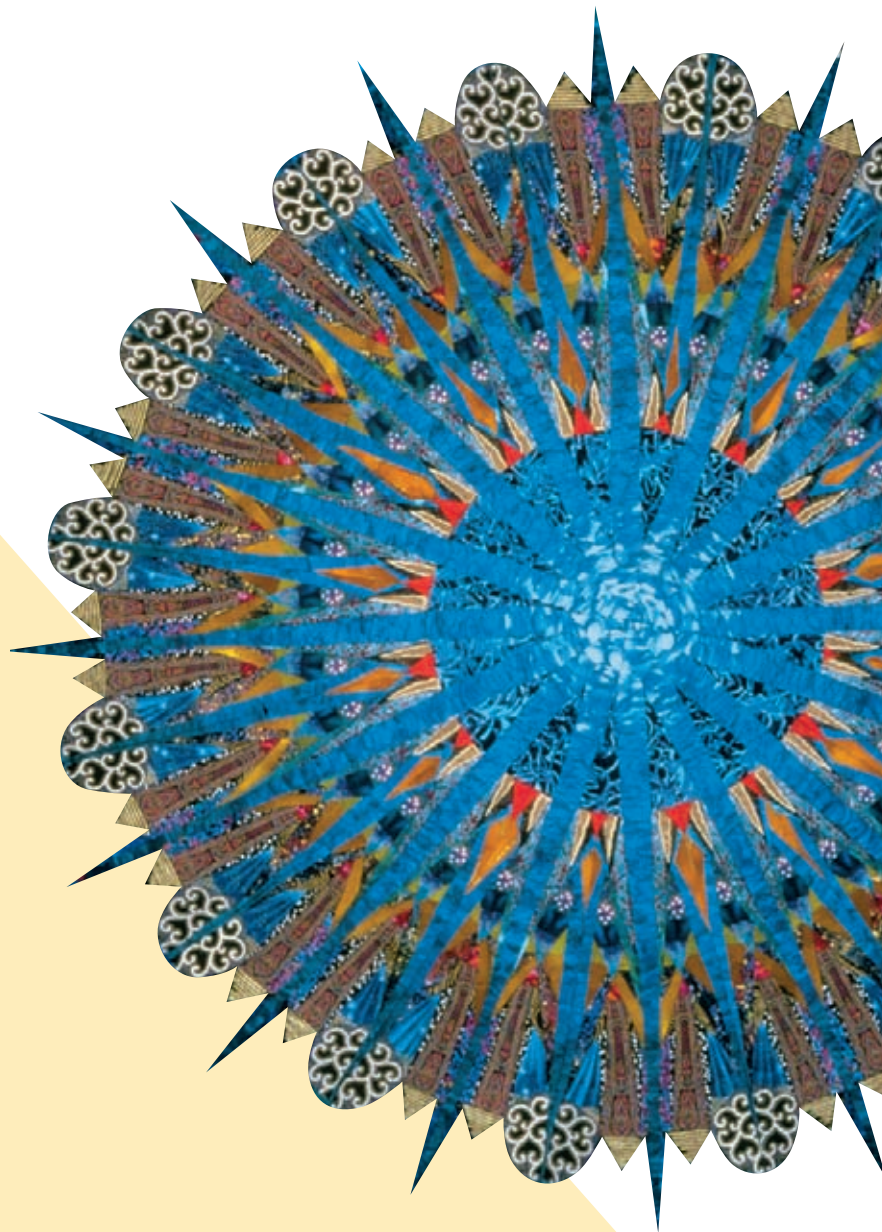
Alterations in Patterns of Health

CHAPTER 4
Nursing Care of Clients Having Surgery

CHAPTER 5
**Nursing Care of Clients Experiencing Loss,
Grief, and Death**

CHAPTER 6
**Nursing Care of Clients with Problems of
Substance Abuse**

CHAPTER 7
**Nursing Care of Clients Experiencing
Disasters**



CHAPTER Nursing Care 4 of Clients Having Surgery

LEARNING OUTCOMES

- Discuss the differences and similarities between outpatient and inpatient surgery.
- Describe the various classifications of surgical procedures.
- Identify diagnostic tests used in the perioperative period.
- Describe nursing implications for medications prescribed for the surgical client.
- Provide appropriate nursing care for the client in the preoperative, intraoperative, and postoperative phases of surgery.
- Identify variations in perioperative care for the older adult.
- Describe principles of pain management specific to acute postoperative pain control.
- Use the nursing process as a framework for providing individualized care for the client undergoing surgery.

CLINICAL COMPETENCIES

- Assess the physiologic health status of clients for surgery to determine their ability to tolerate surgery and risks for complications.
- Assess the psychosocial health status of the client and family.
- Transfer the client safely within the operating room and throughout the postoperative stay.
- Participate in client and family teaching prior to anesthesia and prior to discharge from the facility.
- Create and maintain a sterile field in the operating room and use universal precautions to prevent infections.
- Provide equipment and supplies based on client need.
- Perform sponge, sharps, and instrument counts before discharging the client from the operating room.
- Physiologically monitor the client during surgery. As part of the interdisciplinary team, promote safe practice and client rehabilitation.
- Monitor and control the environment to prevent accidents or injury to the client and the healthcare team. Respect the client's rights, including privacy, at all times (AORN, 2005b).

MEDIA LINK



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

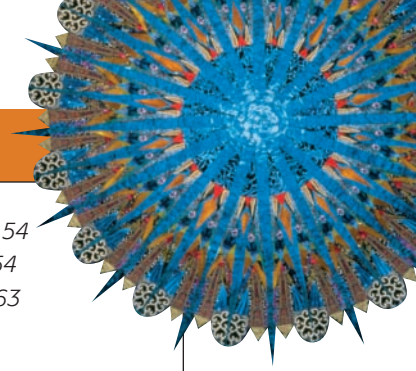


KEY TERMS

anesthesia, 61
circulating nurse, 65
conscious sedation, 63
dehiscence, 78
equianalgesia, 80
evisceration, 78
freestanding outpatient surgical facilities, 55

general anesthesia, 61
independent nursing care, 54
informed consent, 55
interdisciplinary care, 54
intraoperative phase, 54
perioperative nursing, 54
positioning, 67

postoperative phase, 54
preoperative phase, 54
regional anesthesia, 63
scrub person, 66
surgery, 54



Surgery is an invasive medical procedure performed to diagnose or treat illness, injury, or deformity. Although surgery is a medical treatment, the nurse assumes an active role in caring for the client before, during, and after surgery. Interdisciplinary care and independent nursing care together prevent complications and promote the surgical client's optimal recovery. **Interdisciplinary care** refers to healthcare services provided by professionals in addition to physicians and surgeons including nurses, pharmacists, social workers, medical technologists, dietitians, chaplains, physical therapists, and occupational therapists. The interdisciplinary team addresses client issues beyond a strictly medical focus. **Independent nursing care** is care provided by nurses within the scope of their practice without the direction or supervision of a physician. Dependent nursing care refers to interventions by nurses that must have a physician order for the action to be legal.

Perioperative nursing is a specialized area of practice. It incorporates the three phases of the surgical experience: preoperative, intraoperative, and postoperative. The **preoperative phase** begins when the decision for surgery is made and ends when the client is transferred to the operating room. The **intraoperative phase** begins with the client's entry into the operating room and ends with admittance to the postanesthe-

sia care unit (PACU), or recovery room. The **postoperative phase** begins with the client's admittance to the PACU and ends with the client's complete recovery from the surgical intervention.

Surgical procedures can be classified according to purpose, risk factor, and urgency (Table 4–1). Based on this information, nursing care can be individualized to best meet client needs.

Although the perioperative nurse works in collaboration with other healthcare professionals to identify and meet the client's needs, the perioperative nurse has the primary responsibility and accountability for nursing care of the client undergoing surgery.

SETTINGS FOR SURGERY

Surgical patients may be inpatients or outpatients. The complexity of the surgery and recovery and the expected disposition of the client following the surgery are the major differences. Sometimes outpatients (i.e., clients intending to be discharged home immediately following surgery) are admitted to the hospital. Cataract removal with or without lens implants, hernia repairs, tubal ligations, vasectomies, dilation

TABLE 4–1 Classification of Surgical Procedures

	CLASSIFICATION	FUNCTION	EXAMPLES
Purpose	Diagnostic	Determine or confirm a diagnosis	Breast biopsy, bronchoscopy
	Ablative	Remove diseased tissue, organ, or extremity	Appendectomy, amputation
	Constructive	Build tissue/organs that are absent (congenital anomalies)	Repair of cleft palate
	Reconstructive	Rebuild tissue/organ that has been damaged	Skin graft after a burn, total joint replacement
	Palliative	Alleviate symptoms of a disease (not curative)	Bowel resection in client with terminal cancer
	Transplant	Replace organs/tissue to restore function	Heart, lung, liver, kidney transplant
Risk Factor	Minor	Minimal physical assault with minimal risk	Removal of skin lesions, dilation and curettage (D&C), cataract extraction
	Major	Extensive physical assault and/or serious risk	Transplant, total joint replacement, cholecystectomy, colostomy, nephrectomy
Urgency	Elective	Suggested, though no foreseen ill effects if postponed	Cosmetic surgery, cataract surgery, bunionectomy
	Urgent	Necessary to be performed within 1 to 2 days	Heart bypass surgery, amputation resulting from gangrene, fractured hip
	Emergency	Performed immediately	Obstetric emergencies, bowel obstruction, ruptured aneurysm, life-threatening trauma

and curettage (D&C), hemorrhoidectomies, and biopsies are commonly performed outpatient surgeries.

Inpatient and outpatient surgeries are performed in the same operating suites in most hospitals. There are also **freestanding outpatient surgical facilities**, which are not physically connected to a hospital. Surgeons may practice in both hospital and freestanding surgical facilities. Some outpatient surgeries are performed in surgeons' offices rather than surgical centers. The number of outpatient surgeries has grown rapidly in the past decade as part of the effort to contain the high costs of surgery. Moreover, increasingly complex surgeries on clients with complicated medical problems are now commonly performed on an outpatient basis. This increase in number of procedures and acuity level of the clients has presented a challenge to the perioperative nurse, the client, and the family.

Outpatient surgery potentially offers several advantages:

- Decreased cost to the client, hospital, and insuring agency
- Reduced risk of hospital-acquired infection
- Less interruption in the client's and family's routine
- Possible reduction in time lost from work and/or other responsibilities
- Less physiologic stress to the client and family.

Outpatient surgery also presents some disadvantages:

- Less time for the nurse to establish rapport with client and family
- Less time for the nurse to assess, evaluate, and teach the client and family
- Lack of opportunity for the nurse to assess for the risk of postoperative complications that may occur after discharge
- Less time for adequate pain control before discharge.

Many similarities exist between nursing care of the inpatient and outpatient surgical clients. Physical care is provided in much the same manner in the preoperative, intraoperative, and postoperative phases of surgery. The major differences lie in the degree of teaching and emotional support that must be provided for outpatient surgical clients and their families. In addition to the physiologic insult of surgery, the outpatient surgical client must cope with the additional stress of needing to learn a great deal of information in a short span of time. The nurse teaches the client and family in both the preoperative and postoperative periods to enable the client to perform self-care following discharge. More extensive teaching and emotional support is mandated as clients requiring more complex surgical procedures and experiencing more complicated health problems undergo outpatient surgery.

PRACTICE ALERT

Clients having outpatient surgery should wear or bring clothing that will be easy to put on after surgery and accommodate any dressings or appliances. Furthermore, despite being NPO, clients must bring any medications including herbal preparations they regularly use (especially those prescribed by other providers), such as steroids, antibiotics, anticoagulants, antivirals, diuretics, oral contraceptives, hypotensives, cardiotonics, hypoglycemics, asthma medications, seizure medications, and analgesics. Clients should consult with the surgeon and anesthesiologist before taking these medications.

Following outpatient surgery, the client is discharged after meeting the institution's criteria:

- Vital signs are stable.
- Client is able to stand and begin to walk without dizziness or nausea.
- Pain is controlled or alleviated.
- Client is able to urinate.
- Client is oriented.
- Client and/or significant other demonstrates understanding of postoperative instructions.

LEGAL REQUIREMENTS

It is the responsibility of the surgeon who performs the procedure to obtain the client's consent for care. The surgeon should discuss the procedure with the client and family in language they can understand. **Informed consent** is disclosure of risks associated with the intended procedure or operation to the client, and includes a legal document required for certain diagnostic procedures or therapeutic measures, including surgery. The language of the document varies according to statutory and common law of each state. This legal document protects the client, nurse, physician, and healthcare facility. Informed consent includes the following information:

- Need for the procedure in relation to the diagnoses
- Description and purpose of the proposed procedure
- Possible benefits and potential risks
- Likelihood of a successful outcome
- Alternative treatments or procedures available
- Anticipated risks should the procedure not be performed
- Physician's advice as to what is needed
- Right to refuse treatment or withdraw consent.

Ideally, the nurse should be present when the preceding information is provided. Later, the nurse can discuss the information with the client and family, if necessary. If the client has questions or concerns that were not discussed or made clear, or if the nurse questions the client's understanding, the surgeon is responsible for supplying further information. If these situations arise, the nurse should contact the surgeon before having the client sign a consent for operation and special procedures. Following a thorough discussion of the consent for operation or special procedures, the nurse witnesses the client's voluntary signature on the form (Figure 4-1 ■). The nurse also signs the form, indicating that the correct person is signing the form and that the client was alert and aware of what was being signed.

Perioperative Risk Factors

Prior to planning and implementing care for the surgical client, the nurse must first assess the client's needs and the factors that may increase the risks associated with surgery. The type of surgical procedure directs the assessment and interventions planned by the nurse. However, a complete assessment is also necessary to identify *risk factors* and to determine the client's overall health status. Table 4-2 lists common risk factors for the client undergoing surgery, and the related nursing interventions and implications. For example, when a client is admitted for



M.R. # _____

Informed Consent to Operation, Administration of Anesthetics, and to the Rendering of Other Medical Services

1. I do hereby authorize and direct _____ M.D./D.O./D.D.S., my physician, and/or such associates or assistants of his choice, to perform the following operation or procedure:

upon _____ (patient's name). I understand that the above named physician and his associates or assistants are employed by me and will be occupied solely with performing such operation or procedure.

2. The nature of the operation or procedure has been explained to me and no warranty or guarantee has been made as to result or cure. I have been advised that additional surgical and/or medical procedures or treatment may be deemed necessary during the course of the operation or procedure consented hereto, and I fully consent to such additional procedures and treatment which, in the opinion of my physician, are deemed necessary or desirable for the well-being of the patient. The possible risks and complications of the operation or procedure have been explained to me. The physician has explained to me the above medical terminology and I satisfactorily understand the type of operation/procedure.

3. I hereby authorize and direct the above named physician and/or his associates or assistants or those working under his direction to provide for _____ (patient's name) such additional services as he or they may deem reasonable and necessary, including, but not limited to, the administration and maintenance of anesthesia, blood or blood derivatives, and the performance of services involving pathology and radiology and I hereby consent thereto. The possible risks and complications of blood transfusions and the administration of anesthetics have also been explained to me.

4. I understand also that the persons in attendance at such operation or procedure for the purpose of administering anesthesia, and the radiologists in attendance at such operation or procedure for the purpose of performing radiological (X-ray) service are not the agents, servants, or employees of St. Francis Medical Center nor of any physician, but are independent healthcare providers who are employed by me in the same way that my surgeon and physician are employed by me.

5. I hereby authorize the Medical Center pathologist or personnel to use their discretion in the disposal of any severed tissue or member.

6. I hereby grant permission for St. Francis Medical Center to obtain clinical photographs for educational purposes or for my patient record as deemed necessary by my physician.

7. The **exception to this consent:** (If none, write "none".) _____ and I assume full responsibility for these exceptions.

PATIENT'S SIGNATURE **DATE**

If the patient is a minor or incompetent or is unable to sign, the following must be completed:

I hereby certify that I am the (relationship) _____ of the above named patient who is unable to sign because _____, and I am fully authorized to give the consent herein granted.

 SIGNATURE DATE


WITNESSED BY/date **WITNESSED BY/date**

If signed in the physician's office, the following MUST be completed by the Medical Center.

REVIEWED BY (patient name) /date **WITNESSED BY /date**

Figure 4-1 ■ Informed consent form.

TABLE 4–2 Nursing Implications for Surgical Risk Factors

FACTOR	ASSOCIATED RISK	NURSING IMPLICATIONS
Advanced age	Older adults have age-related changes that affect physiologic, cognitive, and psychosocial responses to the stress of surgery; decreased tolerance of general anesthesia and postoperative medications; and delayed wound healing.	Selected nursing interventions are summarized in Table 4–6.
Obesity	The obese client is at increased risk for delayed wound healing, wound dehiscence, infection, pneumonia, atelectasis, thrombophlebitis, arrhythmias, and heart failure.	Promote weight reduction if time permits. Monitor closely for wound, pulmonary, and cardiovascular complications postoperatively. Encourage coughing, turning, and diaphragmatic breathing exercises and early ambulation.
Malnutrition	Reserves may not be sufficient to allow the body to respond satisfactorily to the physical assault of surgery; organ failure and shock may result. Increased metabolic demands may result in poor wound healing and infection.	With the physician and dietitian, promote weight gain by providing a well-balanced diet high in calories, protein, and vitamin C. Administer total parenteral nutrition intravenously, nutritional supplements, and tube feedings as prescribed. Daily weights and calorie counts also may be ordered.
Dehydration/ electrolyte imbalance	Depending on the degree of dehydration and/or type of electrolyte imbalance, cardiac dysrhythmia or heart failure may occur. Liver and renal failure may also result.	Administer intravenous fluids as ordered. Monitor I&O. Monitor client for evidence of electrolyte imbalance (see Chapter 10 ) .
Cardiovascular disorders	Presence of cardiovascular disease increases the risk of hemorrhage and shock, hypotension, thrombophlebitis, pulmonary embolism, stroke (especially in the older client), and fluid volume overload.	Diligently monitor vital signs, especially pulse rate, regularity, and rhythm, and general condition of the client. Closely monitor fluid intake (oral and parenteral) to prevent circulatory overload. Assess skin color. Assess for chest pain, lung congestion, and peripheral edema. Observe for signs of hypoxia, and administer oxygen as ordered. Early postoperative ambulation and leg exercises reduce the risk of vascular problems, such as thrombophlebitis and pulmonary embolism.
Respiratory disorders	Respiratory complications such as bronchitis, atelectasis, and pneumonia are some of the most common and serious postoperative complications. Respiratory depression from general anesthesia and acid–base imbalance may also occur. Clients with pulmonary disease are more at risk for developing these complications.	Closely monitor respirations, pulse, and breath sounds. Also assess for hypoxia, dyspnea, lung congestion, and chest pain. Encourage coughing, turning, and diaphragmatic breathing exercises and early postoperative ambulation. Encourage the client to quit smoking or at least to reduce the number of cigarettes smoked.
Diabetes mellitus	Diabetes causes an increased risk for fluctuating blood glucose levels, which can lead to life-threatening hypoglycemia or ketoacidosis. Diabetes also increases the risk for cardiovascular disease, delayed wound healing, and wound infection.	Monitor the client closely for signs and symptoms of hypoglycemia and hyperglycemia. Monitor blood glucose levels every 4 hours or as ordered. Administer insulin as prescribed. Encourage intake of food at the designated meal and snack times.
Renal and liver dysfunction	The client with renal or liver dysfunction may poorly tolerate general anesthesia, have fluid/electrolyte and acid–base imbalances, decreased metabolism and excretion of drugs, increased risk for hemorrhage, and delayed wound healing.	Monitor for fluid volume overload, intake and output (I&O), and response to medication. Evaluate closely for drug side effects and evidence of acidosis or alkalosis.
Alcoholism	The client may be malnourished and experience delirium tremens (acute withdrawal symptoms). More general anesthesia may be required. Hemorrhage and delayed wound healing can result from liver damage and poor nutritional status.	Monitor closely for signs of delirium tremens. Encourage well-balanced diet. Monitor for wound complications. Administer supplemental nutrients parenterally as ordered.

(continued)

TABLE 4–2 Nursing Implications for Surgical Risk Factors (continued)

FACTOR	ASSOCIATED RISK	NURSING IMPLICATIONS
Nicotine use	Cigarette smokers are at increased risk for respiratory complications such as pneumonia, atelectasis, and bronchitis because of increased mucous secretions and a decreased ability to expel them.	Ideally, the client should quit smoking. Be supportive of the client, and monitor closely for respiratory difficulties. Coughing, turning, and diaphragmatic breathing exercises with early ambulation are very important. Increase daily fluid intake to 2500–3000 mL (unless contraindicated) to help liquefy respiratory secretions to aid expectoration. A nicotine patch may help the client tolerate withdrawal during the postoperative period.
Adolescence	Diversity in age, and physical, cognitive, and psychologic maturation makes preparation for surgery vary in content and inclusion of significant others. Increased need for control, privacy, and peer interaction poses special challenges in the acute care setting.	Adapt assessment and interventions to the development level of individual clients, involving them in preparation and care to the extent possible. Allow for regressive and independent behavior including rejection of adult support.
Medications	Anesthesia interaction with some medications can cause respiratory difficulties, hypotension, and circulatory collapse. Other medications can produce side effects that may increase surgical risk.	Inform the anesthesiologist of all prescribed or over-the-counter medications.
Anticoagulants (including aspirin)	May cause intraoperative and postoperative hemorrhage.	Monitor for bleeding. Assess PT/PTT values.
Diuretics (particularly thiazides)	May lead to fluid and electrolyte imbalances, producing altered cardiovascular response and respiratory depression.	Monitor I&O and electrolytes. Assess cardiovascular and respiratory status.
Antihypertensives (particularly phenothiazines)	Increase the hypotensive effects of anesthesia.	Closely monitor blood pressure.
Antidepressants (particularly monoamine oxidase inhibitors)	Increase the hypotensive effects of anesthesia.	Closely monitor blood pressure.
Antibiotics (particularly the “mycin” group)	May cause apnea and respiratory paralysis.	Monitor respirations.
Herbal supplements	Some may prolong the effects of anesthesia. Others may increase the risks of bleeding or raise blood pressure.	Inquire about the use of herbs or other dietary supplements. These should be discontinued at least 2 weeks before surgery.
Temperature variations	Deviations from normothermia, either hypothermia or hyperthermia, may cause infection, cardiac morbidity, myocardial ischemia, surgical bleeding, skin damage, or client discomfort.	Monitor core temperatures and prevent chilling or overheating. Remove wet drapes and test the temperature of fluids used.

surgery on the right knee, it should be of concern to the nurse if this client has diabetes, smokes 1.5 packs of cigarettes per day, has numbness in the right foot, and takes insulin. This information should be incorporated into a care plan, using appropriate nursing diagnoses and interventions to meet all of the client’s needs and assist the client toward full postoperative recovery.

Risks are associated with all surgical interventions. For example, transporting the client to and from the operating suite requires assessment of the needs of the client for supplemental oxygen, intravenous therapy, cardiac monitoring, and safety issues pertaining to the means of transport. Many clients enter the operating suite highly anxious and may benefit from medication to help them relax prior to administration of anesthesia. This can

be discussed with the anesthetist. Chemicals, electrical equipment, and environmental hazards in the surgical area have the potential for harm and must be monitored and maintained carefully.

Unfortunately, there is a risk of performing the wrong surgery on the wrong client: wrong site, wrong procedure, wrong person (Gibbs, 2005). In 2004, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) issued a universal protocol mandating preoperatively (1) verifying the procedure, (2) physically marking and initialing the site, and (3) taking a “time out” before starting any procedure. The goal of the time out is to ensure the right procedure will be performed on the right client on the correct site with the necessary and correct healthcare providers in attendance. A time out is an

intentional stoppage of the preparation for the operation, in the operating suite, before the patient is anesthetized. All participants are introduced and encouraged to ask any questions or express any concerns before the surgery is commenced. This strategy was adopted from the airline industry, where accidents can lead to fatal outcomes.

Another potential error is retained foreign bodies such as instruments, needles, or sponges. The incidence of this problem increased after airport security was enhanced in 2001 and surgical instruments were discovered in former clients when they were boarding airplanes. To prevent accidental retention the American College of Surgeons recommends consistent application and adherence to standardized procedures for counting of objects used in the surgery, methodical wound exploration before closing the site, using x-ray detectable materials in the wound, maintenance of optimal OR environments to allow focused surgical performance, employing technological methods to ensure no unintended item remains, and suspension of these measures as needed in life-threatening situations (Gibbs, 2005). Like wrong site injury, foreign body retainment seems to be linked to poor communication among perioperative care providers and faulty processes of care in the operating room.

A complete history of medications the client has been taking regularly is vital information. Over-the-counter medicines and herbal preparations as well as prescription medications may interact with drugs given during surgery, putting a client at increased risk (Bailey & Dresser, 2004). As part of the preoperative planning and teaching, early consideration of complementary and alternative medicine is important. This information should be obtained in a matter of fact and non-judgmental manner, because a judgmental attitude could cause the client to withhold information.

Anticoagulant medications should be discontinued by the client prior to surgery to prevent excessive blood loss during surgery. These include aspirin and nonsteroidal anti-inflammatory drugs. If laboratory tests of bleeding time, PT, PTT, and INR are elevated, the surgery may be cancelled. Guidelines for discontinuing use vary according to the particular medication; it is generally recommended that aspirin or products containing aspirin be discontinued 5 days or longer before surgery. Similarly, herbs or nutritional supplements that impair clotting should be discontinued 2 weeks prior to surgery (Norred & Brinker, 2001; Saper, 2005). The most common self-prescribed medicines that may inhibit coagulation are vitamin E, garlic, ginkgo, ginseng, fish oil, and chamomile (Norred & Brinker, 2001). Many plants contain coumarins with the potential to interact with warfarin and inhibit coagulation. Others inhibit platelet aggregation or prevent the conversion of fibrinogen to fibrin. All of these create a risk for bleeding.

Clients taking warfarin for the risk of blood clots due to atrial fibrillation will be counseled about the appropriate time to withdraw warfarin. If surgery is urgent due to trauma or sudden onset of morbidity, the impact of anticoagulants needs to be evaluated with PT, PTT, and INR before the operation and appropriate support for clotting administered.

In addition to clotting impairment, excessive consumption of herbal medicines or dietary supplements can produce levels

of chemicals that interact with conventional medications, exacerbating or impairing the intended effect. Anesthesia drugs often decrease hepatic blood flow and interfere with metabolism and elimination of medications (Bailey & Dresser, 2004; Bressler, 2005). This increases the risk of adverse drug–herbal supplement interactions during surgery. Cardiovascular instability, impaired glucose control, increased metabolism of perioperative medication, and unpredictable response to anesthesia are categories of adverse reactions of perioperative herbal use (Saper, 2005; Wren et al., 2002).

In the perioperative period, hypothermia and hyperthermia are risks. Typically, surgical suites are maintained quite cold. Lowering environmental temperature is common in surgical suites, but research shows that normothermia (core body temperature in the range of 36.0 to 37.5°C [Porth, 2005]) in the client provides less risk to the client for infection, cardiac morbidity, myocardial ischemia, surgical bleeding, and client discomfort. Methods to minimize the risk of hypothermia include:

- Apply warm blankets on arrival in the surgical area and after sterile drapes are removed.
- Limit the amount of skin exposed during positioning and skin preparation.
- Limit the time of skin exposure between prepping and draping.
- Prevent surgical drapes from becoming wet.
- Adjust the room temperature for normothermia.
- Monitor client's temperature to avoid overheating.
- Use heat-maintenance devices such as warming units, stockings, caps, and leggings.
- Warm irrigation or infusion solutions as needed.
- Humidify the airway.

The anesthetized client loses heat intraoperatively and is unable to restore temperature through the normal mechanisms of shivering or muscle contractions. Hyperthermia should also be avoided. Heating of fluids or use of heating units necessitates accurate measurement of the temperature and assessment of the client's skin integrity. Body temperature is best evaluated through core temperature monitoring, which includes esophageal or tympanic assessment (AORN Recommended Practices Committee, 2000).

Interpreting and responding to identified risk factors require nursing judgment. It is important to bring information to the attention of the surgeons and anesthesiologists prior to surgery, so necessary modifications can be made for the patient.

PRACTICE ALERT

Remind diabetic clients that the stress of surgery increases rather than decreases blood sugar. Coordinate insulin injection and/or hypoglycemic medication with the client, surgeon, and anesthesiologist.

Interdisciplinary Care



The client undergoing surgery receives care from a number of healthcare providers. Surgeons, nurses, scrub persons, anesthetists, phlebotomists, x-ray technicians, registration clerks, and transporters are often involved in securing the safety and health of clients. Case managers, social workers,

and spiritual care providers are available based on client need and desire. This interdisciplinary approach focuses on placing the client in the best possible health status before, during, and after surgery.

Diagnosis

Diagnostic tests performed prior to surgery provide baseline data or reveal problems that may place the client at additional risk during and after surgery. Because of the trend toward shortened hospital stays, many diagnostic studies and procedures are performed in a preadmission clinic within a week prior to elective surgery.

Complete blood counts, electrolyte studies, coagulation studies, and urinalysis are the most commonly performed preoperative laboratory tests. Table 4–3 discusses the significance and nursing implications of abnormal findings for these common tests. Additional diagnostic tests may be performed as the history and physical findings indicate. For example, if the

client has a low hemoglobin and hematocrit, and significant blood loss during surgery is anticipated, then the surgeon may order a type and crossmatch of the client's blood for a possible transfusion.

In addition to laboratory tests, older clients or those with risk factors related to heart and lung function typically have a chest x-ray. This radiologic procedure provides baseline information about the size, shape, and condition of the heart and lungs. Pulmonary complications such as lung disease, tuberculosis, calcification, infiltration, or pneumonia may require that surgery be postponed to allow the client to undergo further evaluation or treatment. If findings are abnormal and the surgery cannot be postponed, information from the chest x-ray study can be used to determine the safest form of anesthesia.

Another commonly performed preoperative diagnostic procedure is the electrocardiogram (ECG). This test is ordered routinely on clients undergoing general anesthesia when they are over 40 years of age or have cardiovascular disease. The ECG

TABLE 4–3 Laboratory Tests for Perioperative Assessment

TEST	SIGNIFICANCE OF INCREASED VALUES	SIGNIFICANCE OF DECREASED VALUES	NURSING IMPLICATIONS
Hemoglobin (Hgb) and hematocrit (Hct)	Dehydration, excessive fluid plasma loss, polycythemia vera	Fluid overload, excessive blood loss, anemia	Monitor oxygenation, (I&O), and vital signs; assess for bleeding.
Glucose and Hemoglobin-A	Impaired glucose metabolism, stress, or infection	Inadequate glucose intake in relation to insulin	If decreased, monitor for signs and symptoms of hypoglycemia. Notify surgeon if <70 mg/dL or > 180 mg/dL.
White blood cell (WBC) count	Infectious/inflammatory processes, leukemia	Immune deficiencies	Monitor for signs of inflammation; monitor drainage, temperature, and pulse. Use strict universal precautions.
Platelet count	Malignancies, polycythemia vera	Clotting deficiency disorders, chemotherapy	If decreased, assess for bleeding at incision sites and drainage tubes, and assess for hematomas.
Carbon dioxide (CO ₂)	Emphysema, chronic bronchitis, asthma, pneumonia, respiratory acidosis, vomiting, nasogastric suctioning	Metabolic acidosis, hyperventilation	Monitor respiratory status and arterial blood gases (ABGs).
Electrolytes Potassium (K ⁺)	Kidney dysfunction, dehydration, suctioning	Side effects of diuretics, vomiting, NG suctioning	Monitor K ⁺ level, cardiac and neurologic function, and preoperative diuretic therapy.
Sodium (Na ⁺)	Kidney dysfunction, normal saline-containing intravenous fluids	Side effects of diuretics, vomiting, NG suctioning	Monitor Na ⁺ level and I&O; assess for peripheral edema and effects of perioperative diuretic therapy.
Chloride (Cl ⁻)	Kidney dysfunction, dehydration, alkalosis	Side effects of diuretics, vomiting, NG suctioning	Monitor Cl ⁻ level and I&O; assess for peripheral edema and perioperative diuretic therapy.
Prothrombin time (protime, or PT) and partial thromboplastin time (PTT)	Defect in mechanism for blood clotting, anticoagulant therapy (aspirin, heparin, warfarin), side effect of other drugs affecting clotting time	Hypercoagulability of the blood may lead to thrombus formation in the veins	If clotting time is elevated, monitor PT/PTT values. Assess for bleeding at incision site and drainage tubes and for hematomas. If clotting time is decreased, monitor for thrombus formation (pulmonary emboli, thrombophlebitis), and evaluate PT and PTT values.
Urinalysis	Varied	Varied	Used to detect abnormal substances (e.g., protein, glucose, red blood cells, or bacteria) in the urine. Notify surgeon if abnormalities are detected.

provides data for evaluation about either new or preexisting cardiac conditions. The client's surgery may be cancelled or postponed if a life-threatening cardiac condition is discovered.

In addition to the chest x-ray study and ECG, other diagnostic tests may be performed preoperatively to gather further assessment data. For example, for clients who have chronic obstructive pulmonary disease, pulmonary function studies often are performed to determine the extent of respiratory dysfunction. This information guides the anesthesiologist before and during surgery in choosing the type of anesthetic to be used, and it guides the surgeon and nursing staff in the recovery phase.

Creatine clearance (the calculated amount of creatinine in a 24-hour urine collection) is the best indicator of renal function (Pagana & Pagana, 2002). As clients age, muscle mass decreases and serum creatinine may be falsely low because of decreased muscle turnover. A low serum creatinine is an indicator of good renal function, so the creatinine value must be confirmed in the urine. Older adults are especially susceptible to renal insufficiency, which puts them at risk for volume overload in the perioperative period and accumulation of metabolic by-products and medications dependent on renal clearance (Loran et al., 2005).

Medications

The client having surgery receives medications before, during, and after surgery to achieve specific therapeutic outcomes. Traditionally, all medication orders are cancelled when the client goes to surgery and must be rewritten by the physician when the client returns to the postsurgical care unit.

The surgical client usually is given preoperative medications 45 to 70 minutes before the scheduled surgery. Any delay in administration should be reported promptly to the surgical department. Preoperative medications may also be given in the surgical holding room to produce the desired effects.

An increasingly common strategy to prevent intense or lingering pain is the use of *preemptive analgesia*. Preemptive analgesia prevents sensitization of the central and peripheral nervous system by painful stimuli by blocking the pain pathways with local, regional, or epidural analgesia prior to incision. Sensitization to pain prolongs the painful experience; blocking the sensitization throughout the perioperative period results in decreased pain in the postoperative period, shortened hospital stay, quicker return to self-care, and decreased residual pain (Gottschalk & Smith, 2001).

A combination of preoperative drugs may be ordered to achieve the desired outcomes with minimal side effects. Such outcomes include sedation, reducing anxiety, inducing amnesia to minimize unpleasant surgical memories, increasing comfort during preoperative procedures, reducing gastric acidity and volume, increasing gastric emptying, decreasing nausea and vomiting, and reducing the incidence of aspiration by drying oral and respiratory secretions.

Antibiotic prophylaxis is effective in the prevention of postoperative complications in many surgeries (Andersen et al., 2005; Bedouch et al., 2004; Bratzler et al., 2005; Silber et al., 2005). Table 4-4 outlines commonly prescribed preoperative medications.

Decisions about which of the client's routine medications to administer prior to surgery when the client is NPO require careful analysis. The best guideline is to confer with the surgeon and anesthesiologist about specific medications. The reason for caution has to do with potential interactions between anesthesia and medications and the effect on the client if drugs such as steroids, antiseizure medications, and tranquilizers are discontinued abruptly. Generally, insulin is withheld when the client is NPO, but depending on the anticipated length of the surgery, the dosage may be adjusted for the previous evening as well as the morning of surgery. Under anesthesia the signs and symptoms of hypoglycemia (insulin reaction) are absent, so withholding insulin the morning of surgery when the client is NPO is advisable. Plasma glucose is monitored intermittently during surgery with the goal of maintaining normal blood sugar level (see Table 4-2). Clients who ordinarily manage their diabetes mellitus with oral medications often experience hyperglycemia perioperatively. It has been common to manage hyperglycemia with sliding scale insulin. Evidence-based practice supports subcutaneous basal insulin administration for hyperglycemic clients to maintain glycemia below 180 mg/dL throughout the perioperative period. This practice is associated with better healing, fewer infections, and shorter hospital stays (Odom-Forren, 2006).

Assessment of medications the client uses is vital prior to anesthesia. In addition to medications prescribed by a physician, assessment should include over-the-counter preparations (including aspirin and illegal drugs) and herbal medications (see Table 4-2).

INTRAOPERATIVE MEDICATIONS **Anesthesia** is used to produce unconsciousness, analgesia, reflex loss, and muscle relaxation during a surgical procedure. General anesthesia produces these effects, whereas regional anesthesia results in analgesia, reflex loss, and muscle relaxation but does not cause the client to lose consciousness. An anesthesiologist (physician) or certified registered nurse anesthetist (CRNA) administers anesthetics during the intraoperative phase of surgery.

General Anesthesia **General anesthesia** is most commonly administered by inhalation and, to a lesser extent, by the intravenous route. It produces central nervous system depression. As a result, the client loses consciousness and does not perceive pain, skeletal muscles relax, and reflexes diminish.

Advantages to general anesthesia include rapid excretion of the anesthetic agent and prompt reversal of its effects when desired. Additionally, general anesthesia can be used with all age groups and any type of surgical procedure. It produces amnesia.

Disadvantages of general anesthesia include risks associated with circulatory, respiratory, hepatic, and renal side effects. Clients with serious respiratory or circulatory diseases, such as emphysema or congestive heart failure, are at greater risk for complications. Clients with renal or hepatic disease cannot metabolize and eliminate anesthetics safely.

General anesthesia is provided with inhalation agents or total intravenous anesthesia (TIVA). Clients with a history of malignant hyperthermia (MH) avoid inhalation agents because they

TABLE 4-4 Preoperative Medications

GENERIC	TRADE	DOSE AND ROUTE	ACTION BY CATEGORY	NURSING IMPLICATIONS
Antibiotics	Cefazolin	1–2 g IV ½–2 hr. preop	Prevents surgical site infections in orthopedic and general surgeries and associated with lower risk of mortality in elderly clients	Clients with Beta-Lactam allergies receive Vancomycin (1 g) or Clindamycin (600–900 mg)
Benzodiazepines				
Midazolam	Versed	3–5 mg IM	Decreases anxiety and produces sedation to some extent	Monitor for respiratory depression, hypotension, drowsiness, and lack of coordination.
Diazepam	Valium	2–10 mg PO	Induces amnesia	
Lorazepam	Ativan	1–4 mg IM or IV	May induce substantial amnesia	
Opioid Analgesics				
Morphine	Morphine	5–15 mg IM	Decreases anxiety, provides analgesia	Monitor for respiratory depression and safety if ambulating. Less nausea and vomiting than morphine sulfate. Mild to moderate pain; client cannot be NPO. Mild to moderate pain; client cannot be NPO. Moderate to severe pain; antiemetics may be needed. Very constipating, mild to moderate pain.
Fentanyl	Sublimaze	25–50 mcg IV, IM	Rapid onset, short duration	
Oxycodone	Roxicodone	5–10 mg PO	Immediate release only	
Hydrocodone	Vicodin	5–10 mg PO	available in 5 mg tabs	
Tramadol	Ultram	50–100 mg PO	Includes acetaminophen	
Codeine	Tylenol with Codeine	7.5, 15, or 30 mg	Antidepressant effects with acetaminophen	
Nonopioid Analgesics				
Antacids				
Sodium citrate	Bicitra	15–30 mL PO	Increases the pH and reduces volume of gastric fluid; used in clients with GERD and/or trauma	No significant factors in this setting.
H₂ Receptor Antagonists				
Cimetidine	Tagamet	300 mg IV, IM, or PO	Reduces gastric acid volume and concentration	Monitor for confusion and dizziness in older adults.
Famotidine	Pepcid	20 mg IV		
Ranitidine	Zantac	50 mg IV, IM, or PO		
Gastric Acid Pump Inhibitors				
Lansoprazole	Prevacid	15–60 mg PO	Suppresses gastric acid secretion	Monitor for dizziness and headache, rash, or thirst.
Omeprazole	Prilosec	20–40 mg PO		
Antiemetics				
Metoclopramide	Reglan	10 mg IV	Enhances gastric emptying Tranquilizer	Monitor for sedation and extrapyramidal reaction (involuntary movement, muscle tone changes, and abnormal posture).
Droperidol	Inapsine	10–15 mg PO 0.625–2.5 mg IM		
Anticholinergics				
Atropine sulfate	Atropine sulfate	0.4–0.6 mg IM or IV	Reduces oral and respiratory secretions to decrease risk of aspiration; decreases vomiting and laryngospasm	Monitor for confusion, restlessness, and tachycardia. Prepare client to expect a dry mouth.
Glycopyrrolate	Robinul	0.1–0.3 IM mg or IV		
Scopolamine	Scopolamine	0.4–0.6 mg IM or IV		

can trigger MH (Box 4-1). With the increase in ambulatory and minimally invasive surgeries, anesthetics are used that enable shorter recovery phases. *Fast-tracking* involves a rapid recovery phase, often bypassing the PACU (Hassan & Fahy, 2005).

The phases of general anesthesia are divided into three distinct categories: induction, maintenance, and emergence. During the induction phase, the client receives the anesthetic agent intravenously or by inhalation. During this phase, airway patency

BOX 4–1 Malignant Hyperthermia (MH)

Malignant hyperthermia (MH) is a rare but serious reaction to volatile inhalational anesthetic gases and succinylcholine, a depolarizing neuromuscular blocker. The client manifests the following signs and symptoms: unexplained rise in end-tidal carbon dioxide that does not respond to ventilation, hyperthermia, tachypnea, tachycardia, and sustained skeletal muscle contraction (Carter-Templeton, 2005). If unchecked the condition will progress to hyperkalemia, myoglobinuria, disseminated intravascular coagulation, congestive heart failure, bowel ischemia, and compartment syndrome in the limbs. Dantrolene sodium is the drug that inhibits the muscular pathology and prevents death.

Because the condition is inherited, susceptibility testing is available but the testing is expensive and the most accurate test involves an invasive procedure. The “gold standard” involves biopsy of thigh skeletal muscle tissue to determine sensitivity to caffeine and halothane (CHCT) (Litman & Rosenberg, 2005). Genetic testing is not as sensitive and reliable as CHCT but will be improved with the discovery of more causative mutations. Clients with muscle myopathies such as muscular dystrophy sometimes experience early

signs of MH and respond well to dantrolene. Because the symptoms of MH may manifest with other pathologies, it is important for clients to know if they have a genetic susceptibility to MH which could affect all members of the family (Brandom, 2005).

MH can develop during an operation or when the client returns to the PACU. If the early symptoms of MH (e.g., escalating temperature, increased carbon dioxide production) are suspected, immediately administer 100% oxygen with a non-rebreather mask, stay with the patient, ensure good IV access, and summon the anesthesia provider. The anesthesia provider will order 2.5 mg/kg of dantrolene which can be given IV push. The dantrolene can be repeated up to 10 mg/kg until the signs and symptoms of MH diminish. Measures to decrease core body temperature should be started at once and continued until core temperature is 36.0°C. A urinary catheter should be placed to monitor urine output and blood drawn for testing. Blood gases should be drawn to measure pH; sodium bicarbonate is given to correct metabolic acidosis. Insulin may be ordered to decrease serum potassium. Expect this client to be transferred to the ICU for continued monitoring and doses of dantrolene every 4–6 hours.

is achieved and maintained with either endotracheal intubation or newer devices including the laryngeal mask airway (LMA) esophageal-tracheal Combitube, or lighted stylet or wand (Hassan & Fahy, 2005). These alternative methods of airway maintenance do not require direct visualization of the vocal cords for placement and allow ventilation. Intubation is difficult with some clients and these devices are an option to avoid creation of a surgical airway with a cricothyroidotomy or tracheostomy.

The next phase of general anesthesia is maintenance. During this period, the client is positioned, the skin is prepared, and surgery is performed. The anesthesiologist maintains the proper depth of anesthesia while constantly monitoring physiologic parameters such as heart rate, blood pressure, respiratory rate, temperature, and oxygen and carbon dioxide levels. The final phase of anesthesia is the client’s emergence from this altered physiologic state. As the anesthetic agents are withdrawn or the effects reversed pharmacologically, the client begins to awaken. The endotracheal tube or laryngeal mask is removed (extubated) once the client is able to reestablish voluntary breathing. It is critical to ensure airway patency during this period, because extubation may cause bronchospasm or laryngospasm.

Regional Anesthesia **Regional anesthesia** is a type of local anesthesia in which medication instilled around the nerves blocks transmission of nerve impulses in a particular area. Regional anesthesia produces analgesia, relaxation, and reduced reflexes. The client is awake and conscious during the surgical procedure but does not perceive pain. Regional anesthesia may be classified in several ways:

- Local nerve infiltration is achieved by injecting lidocaine or tetracaine around a local nerve to depress nerve sensation over a limited area of the body. This technique may be used when a skin or muscle biopsy is obtained or when a small wound is sutured.

- Nerve blocks are accomplished by injecting an anesthetic agent at the nerve trunk to produce a lack of sensation over a specific area, such as an extremity.
- Epidural blocks are local anesthetic agents injected into the epidural space, outside the dura mater of the spinal cord. This type of intraspinal anesthesia provides safe and effective pain relief for surgeries for clients of all ages with less risk of adverse effects than general anesthesia. It is indicated for surgeries of the arms and shoulders, thorax, abdomen, pelvis, and lower extremities (Schwartz, 2006). The epidural catheter is often left in place for pain relief in the postoperative period; it is also used for chronic pain management.

Spinal anesthesia is administered similarly to epidural except the anesthetic medication is infused in a single injection. Spinal anesthesia is effective for approximately 90 minutes. Surgeries of the lower abdomen, perineum, and lower extremities are likely to use this type of regional anesthesia. Leakage of cerebrospinal fluid (CSF) into the epidural space causes reduced CSF pressure and postoperative headaches. Treatment may include hydration, caffeine, analgesics, or administration of an epidural blood patch (Schwartz, 2006). Hypotension is common with epidural and spinal anesthesia. Monitor BP and, if critical hypotension occurs, alert the anesthesia provider and expect to increase intravenous fluids and administer vasoactive medications.

Conscious Sedation An increasing number of surgical and diagnostic procedures are being performed using **conscious sedation**. This type of anesthesia provides analgesia, amnesia, and moderate sedation. The pharmacologic effects are produced by administering a combination of intravenous medications with opioids (such as morphine sulfate, meperidine hydrochloride [Demerol], and fentanyl [Sublimaze]) or sedatives (such as diazepam [Valium] and midazolam [Versed]). During conscious sedation the client is able to

independently maintain an open airway. This allows the client to respond to verbal and physical stimulation. Physician supervision is always required and a registered nurse must be prepared to initiate rescue if sedation becomes too deep. Institutions base their credentialing requirements on professional organization guidelines, regulatory agency requirements, and state law (O'Donnell et al., 2003).

Assessment prior to conscious sedation includes evaluating the appropriateness of the client based on physical status. Clients with compromised circulation or airway, a history of sleep apnea or snoring, a history of problems with anesthesia or analgesia, or medications that would potentially interact with conscious analgesia medications may need an anesthesiologist to manage the effects of anesthesia. Clients need to be appropriately fasting, and baseline vital signs must be taken prior to giving a sedative. A consent form must be signed by the client, and a patent IV line must be in place. Equipment to rescue the client should be available if sedation becomes too deep. Monitor oxygen saturation, pulse, breathing, and level of consciousness throughout the procedure.

Common adverse side effects include venous thrombosis, phlebitis, local irritation, confusion, drowsiness, hypotension, and apnea. Reversal agents (naloxone hydrochloride [Narcan] and flumazenil [Romazicon]) are used as needed to enhance the safety of conscious sedation.

POSTOPERATIVE MEDICATIONS Management of acute postoperative pain by medication improves with greater understanding of pain physiology and the development of better methods to deliver adequate pain medication. For more information on pain management, see the nursing care section later in this chapter on managing acute postoperative pain and also see Chapter 9 ∞.

Established, persistent, severe pain is more difficult to treat than pain that is at its onset. Therefore, postoperative analgesics should be administered at regular intervals around the clock (ATC) to maintain a therapeutic blood level. Administering analgesics as needed (prn) lowers this therapeutic level; delays in medication administration further increase pain intensity. Therefore, prn administration of analgesics is not recommended in the first 36 to 48 hours postoperatively. Patients using patient-controlled analgesia (PCA) or patient-controlled epidural analgesia (PCEA) in the postoperative period need to be taught the importance of using the allowed dosages regularly to prevent increasing pain levels.

In the immediate postoperative period, older adult clients benefit from the same protocol for morphine titration as do younger clients. Intravenous morphine may be initiated at a slightly reduced dose and then titrated to the same protocol for younger patients. Morphine-related adverse effects such as nausea, vomiting, respiratory depression, urinary retention, pruritus, and allergy or sedation are similar among varying age groups. However, older adult clients require fewer opioids than younger clients in the later postoperative period. PCEA may be more effective for older adult clients and is associated with earlier improved mental status and bowel activity (Loran et al., 2005).

PRACTICE ALERT

Nurses are responsible for assessing clients' pain level and administering pain medication. Work collaboratively with surgeons to schedule postoperative analgesics rather than rely on prn administration orders.

Nonsteroidal anti-inflammatory drugs (NSAIDs) treat mild to moderate postoperative pain. This category of drugs should be given soon after surgery (orally, parenterally, or rectally) along with opioids unless contraindicated. Although NSAIDs may not be sufficient to control pain completely, they allow lower doses of opioid analgesics and, therefore, fewer side effects. NSAIDs can be given safely to older clients, but observe closely for side effects, particularly gastric and renal toxicity.

Opioid analgesics, such as morphine, are considered the foundation for managing moderate to severe postoperative pain. Opioid dosage requirements vary greatly from one client to another, so the dosage must be individually tailored. Later in the postoperative recovery period, opioid analgesics (oral or intramuscular) may be given prn. In this way, pain relief can be maintained, while the potential for drug side effects is decreased.

Contrary to the belief of many healthcare providers (including nurses), physical dependence and tolerance to opioid analgesics is uncommon in short-term postoperative use. Additionally, opioid analgesics, when used to treat acute pain, rarely lead to psychologic dependence and addiction. According to the World Health Organization ladder, acute pain is appropriately treated with opioids, tapering to acetaminophen as healing progresses. Chronic pain, in contrast, increases from acetaminophen to opioids as tolerance develops or the condition worsens. The opioid-naïve client will tolerate and achieve analgesia with a lower dose of opioid than the client who is opioid-tolerant and uses opioids for chronic pain (Ersek et al., 2004).

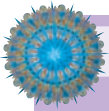
Older clients tend to be more sensitive to the analgesic effects of opioids, experiencing a higher peak effect with a longer duration of pain control. Nursing Research: Evidence-Based Practice on the following page provides additional information.

PRACTICE ALERT

Oral analgesia requires a significantly greater dose than parenteral for most analgesics. Teach clients who are being discharged and their caregivers the relative strength of oral analgesics. (Caution them to not rely on trade names to gauge effectiveness. Two Tylenol with codeine (30 mg) is equianalgesia to 10 mg parenteral morphine; however, oral Demerol 100 mg does not provide equianalgesia with 10 mg parenteral morphine. (See Chapter 9 ∞ for details about equianalgesia.)

Surgical Environment

MEMBERS OF THE SURGICAL TEAM Because of the complexity of the intraoperative environment, members of the surgical team must function as a coordinated unit. The surgeon, surgical assistant(s), anesthesiologist or CRNA, circulating nurse, and



NURSING RESEARCH

Evidence-Based Practice: Assisting Older Adults to Communicate Postoperative Pain

Nurses rely heavily on clients' assessments of the pain they are experiencing. Pain is a subjective experience—a symptom rather than a sign. Rating of pain intensity by the client is the gold standard for knowing when to provide an intervention to decrease pain, and it is considered more accurate than nurses' evaluations of behavioral manifestations of pain. Older clients who believe that healthcare providers know best how to manage their pain are at risk for inadequately treated pain.

McDonald and colleagues (2005) used a program for coaching older adults about postoperative pain communication and management. In this study older adults preparing for single-knee replacement surgery attended a preoperative joint replacement class where they learned about recovering from the surgery and pain management. Forty subjects greater than age 65 were randomly assigned either to the regular class, which included pain management information, or an intervention class, which included both information on pain management and skills to effectively communicate about pain.

The subjects in the communication skills class were taught to enhance pain communication with several strategies consistent with communication accommodation theory (CAT). CAT holds that people adjust their communication based on their own needs and the perceived behavior of others. Skills to enhance communication include evaluating whether the other person (the nurse) has understood the message being given about pain and is willing to include the client as a team member in controlling the pain. Language to describe pain intensity, location, and sensation is modeled. Clients must report their pain because they are the experts about their own pain experience.

The groups were post-tested on postoperative days 1 and 2 and on days 1 and 7 after discharge, using the Brief Pain Inventory Short Form (BPI-SF). This instrument consists of 15 questions that measure pain severity, extent of interference with activities, and pain relief in response to treatment. The group that received the communication skill information had significantly less pain interference with activity and greater pain relief with treatments on postoperative day 1 than the comparison group. On postopera-

tive day 2, pain interference was similar for both groups and pain relief with treatment was greater for the comparison group. Pain severity scores were similar for both groups on postoperative days 1 and 2. There was no significant difference between the two groups in the postdischarge measures of any pain dimension.

IMPLICATIONS FOR NURSING

Findings from this study highlight the importance of coaching older adults to report their pain experience candidly, particularly in the immediate postoperative period. Establishing trust within the nurse–client relationship is critical to relieving pain. Coaching older clients to describe their pain location, intensity, and sensation gives them permission to communicate in a manner with which they may feel uncomfortable at first. Coaching is necessary to dispel myths about professional expertise and to allow clients control and independence so that they are willing to ask for pain medications. Exploring with older clients their perception of pain, as well as the significance it has for recovery from illness, are necessary elements in providing adequate pain relief and restoring health.

CRITICAL THINKING IN CLIENT CARE

1. What physiologic changes make pain management more difficult for an 80-year-old client following surgery than for a 30-year-old?
2. Your older client says: "I deserved this pain, so I don't want to take anything to make it better." What would be your response and why?
3. A man of Native American descent, age 76, replies that "something doesn't feel right" when asked to rate his pain on a scale of 0 to 10. His pulse is increased and he is protective of his abdominal incision. What could you ask or do to accurately assess his pain?
4. If your grandfather were having surgery tomorrow, what would you like him to be taught about pain management?
5. An independent, 85-year-old woman has a PCA pump for analgesia following major surgery. She continuously presses the pump button, but continues to complain of severe pain. What do you do now?

scrub person or operating room technician (Figure 4–2 ■) constitute the surgical team. Each member provides specialized skills and is essential to the successful outcome of the surgery. Risks to members of the surgical team from bloodborne pathogens or injury are minimized when the surgical team is well organized and prepared.

The surgeon is the physician performing the procedure. As head of the surgical team, the surgeon is responsible for all medical actions and judgments.

The surgical assistant works closely with the surgeon in performing the operation. The number of assistants varies according to the complexity of the procedure. The assistant may be another physician, a nurse, a physician assistant, or other trained personnel. The assistant performs such duties as exposing the operative site, retracting nearby tissue, sponging and/or

suctioning the wound, ligating bleeding vessels, and suturing or helping suture the surgical wound.

The anesthesiologist or certified registered nurse anesthetist relieves the surgeon of the responsibility for the client's general well-being, thus allowing the surgeon to focus on the technical aspects of the procedure. The anesthesiologist or CRNA evaluates the client preoperatively, administers the anesthesia and other required medications, transfuses blood or other blood products, infuses intravenous fluids, continuously monitors the client's physiologic status, alerts the surgeon to developing problems and treats them as they arise, and supervises the client's recovery in the PACU.

The **circulating nurse** is a highly experienced registered nurse who coordinates and manages a wide range of activities before, during, and after the surgical procedure. For example,



Figure 4–2 ■ A scrub nurse in the operating room.

the circulating nurse oversees the physical aspects of the operating room itself, including the equipment. The circulating nurse also assists with transferring and positioning the client, prepares the client's skin, ensures that no break in aseptic technique occurs, and counts all sponges and instruments. The circulating nurse assists all other team members, including the anesthesiologist or CRNA. Thorough documentation in the surgical area is essential, and the circulating nurse is responsible for documenting intraoperative nursing activities, medications, blood administration, placement of drains and catheters, and length of the procedure. The circulating nurse also formulates a care plan based on physiologic and psychosocial assessments of the client. Finally, the circulating nurse is at all times an advocate for the safety and well-being of the client.

The role of the **scrub person** primarily involves technical skills, manual dexterity, and in-depth knowledge of the anatomic and mechanical aspects of a particular surgery. The scrub person handles sutures, instruments, and other equipment immediately adjacent to the sterile field. The role of the scrub person may be assumed by a registered nurse or an operating room technician (ORT), depending on hospital policy and the complexity of the surgery. Registered nurses are responsible for patient outcomes including the performance of the role of scrub person. AORN believes that registered nurses should maintain an active presence in

the role of scrub person to ensure appropriate delegation and supervision of scrub duties and to maintain an integral link between scrub and circulating responsibilities (AORN, 2005a).

The role of nurses in surgery continues to evolve to improve client care. Although not participating in the surgical procedure, PACU nurses are part of the surgical team. In recent years, nurses have begun to specialize within the already specialized field of perioperative nursing. Specialty surgical teams are developing in response to the demands of increasingly complex technical surgeries. For example, a designated open heart surgical team may be responsible for all open heart cases and ordinarily not be involved with other procedures. The use of specialty surgical teams allows nurses to become highly skilled in a particular range of procedures.

SURGICAL ATTIRE Strict dress codes are necessary in the surgical department to provide infection control within the operating room suites, reduce cross-contamination between the surgery department and other hospital units or departments, and promote both personnel and client health and safety. Based on research and recommendations by hospital infection control authorities, guidelines for attire differ among surgical facilities. Following institutional guidelines, all personnel in the surgical department must be in proper surgical attire. The design and composition of the surgical attire minimize bacterial shedding, thus reducing wound contamination. The area in the surgical department is divided into *unrestricted*, *semirestricted*, and *restricted* zones. The unrestricted zones permit access by those in hospital uniforms or street clothes. These areas may also allow limited access for communicating with operating room personnel.

The semirestricted zones require scrub attire, including a scrub suit, shoe covers, and a cap or hood (Figure 4–3 ■). Hallways, work areas, and storage areas are considered semirestricted. New guidelines exist for attire in the semirestricted and restricted areas of the OR. Previously, each person had to disrobe and don hospital-laundered scrubs. Today, home-laundered scrubs are accepted by many institutions. There is controversy about this, but the infection control decision to allow home laundry was based on data comparing hospital and home-laundered apparel. These items are covered with sterile gowns in the restricted areas only if the person is “scrubbed in” for the surgery. Only fabrics that are woven or disposable and will not harbor bacteria are allowed and all items of apparel must be covered by appropriate fabric. Anything that can be covered with a scrub jacket is acceptable under these guidelines and no fabric other than the approved scrub uniform fabric can be exposed to the environment. AORN guidelines (AORN Recommended Practices Committee, 2005) suggest that home-laundered scrubs be brought to the OR in a clean covering and donned at the facility, not worn into the hospital from home. Institutions vary in their interpretation of these guidelines.

Artificial nails are discouraged in surgery and anywhere the nurse will have direct contact with high-risk clients. These nails are associated with glove tears and even after careful hand washing can harbor potential pathogens (Church, 2003).

Restricted zones are within operating rooms. Personnel wear masks, sterile gowns, and gloves in addition to appropriate scrub attire if they are participating at the operating table.



Figure 4–3 ■ Surgical attire. *A*, Scrub attire includes scrub suit, shoe covers, and cap or hood to cover hair. *B*, Sterile attire includes scrub suit, shoe covers, and cap or hood, plus gown, gloves, and mask.

The outer sterile covering is changed between procedures or when it becomes soiled or wet.

THE SURGICAL SCRUB The surgical scrub is performed to render hands and arms as clean as possible in preparation for a procedure. All personnel who participate directly in the procedure must perform a surgical scrub with a brush and antimicrobial soap. Skin cannot be rendered sterile, but it can be considered “surgically clean” following the scrub. The purposes of the surgical scrub are to:

- Remove dirt, skin oils, and transient microorganisms from hands and forearms.
- Increase client safety by reducing microorganisms on surgical personnel.
- Leave an antimicrobial residue on the skin to inhibit growth of microbes for several hours.

Following the 5- to 10-minute surgical scrub, hands and arms are dried with sterile towels.

Client Preparation

Although much preparation has taken place prior to the client’s transfer to the surgical department, additional activities such as shaving and positioning may be performed. The skin preparation, which usually includes cleansing the area with a prescribed antimicrobial agent, already may have been performed either by the client or by nursing personnel before the transfer to the surgical department. Additional skin cleansing is performed in the surgical department to further decrease microorganisms on the skin and thereby reduce the possibility of wound infection.

The surgeon also may order the skin shaved in and around the proposed incision area (Figure 4–4 ■). Shaving may be

completed preoperatively, but more often it is performed in the surgical department. The extent of shaving varies. Generally, the area shaved is wider than the planned incision because of the possibility of unexpected extension of the incision. Disposable, sterile supplies are used, in accordance with aseptic techniques. However, the benefit of shaving the incisional site has become controversial. Physical trauma to the shaved area can weaken the client’s defense against organisms, thus increasing the chance of wound infection. An altered body image also may result from the physiologic trauma of a surgical shave, particularly if the shave involves the head or groin area. Hospital policy and surgeon preference should be followed.

Preparing the client for surgery also includes **positioning** the client on the operating table. Table 4–5 shows frequently used positions and describes corresponding surgical procedures and possible adverse effects. Positioning exposes the operative site and provides access for anesthesia administration. Proper positioning is imperative to prevent injury to the client. Pressure, rubbing, and/or shearing forces can cause injury to the tissue over bony prominences. If positioning causes normal joint range of motion to be exceeded, injury to muscles and joints can occur. Improper positioning also can lead to sensory and motor dysfunction, resulting in nerve damage. Pressure on peripheral blood vessels can decrease venous return to the heart and negatively affect the client’s blood pressure. Additionally, oxygenation of the blood can be decreased if the client is not properly positioned to promote lung expansion.

Because the anesthetized client cannot respond to discomfort, it is the surgical team’s responsibility to position the client not only for the best surgical advantage but also for client safety and comfort. The circulating nurse refers to hospital policy, the surgeon’s preference, and the client’s history to ensure optimal positioning, and continuously assesses the client.

INTRAOPERATIVE AWARENESS Prior to induction of anesthesia, the circulating nurse establishes rapport with the client to assess the client’s psychologic status. This assessment is continued throughout the surgical procedure. After anesthetic medications have been given, the client may appear oblivious to the surroundings; however, anesthesiologists are concerned about patient awareness with recall of intraoperative events (Hassan & Fahy, 2005). Monitors of depth of anesthesia are based on the knowledge that general anesthesia induction is usually accompanied by increased high-frequency electroencephalogram (EEG) activity, which results in increasing sedation and eventual loss of consciousness. The bispectral index monitor (BIS) and the entropy module are types of monitors used to measure the depth of anesthesia and prevent awareness. These devices are based on EEG activity to indicate level of consciousness and depth of anesthesia (White et al., 2006). Intraoperative awareness is the client’s subconscious awareness of what is being said and done during surgery. White et al. (2006) compared the aforementioned monitors and reported that no patient had intraoperative recall at 24-hour follow-up interview. Although most clients do not consciously remember what happened or what was said, psychologic trauma can result. Because loss of consciousness is gradual, conversations during surgery should be professional.

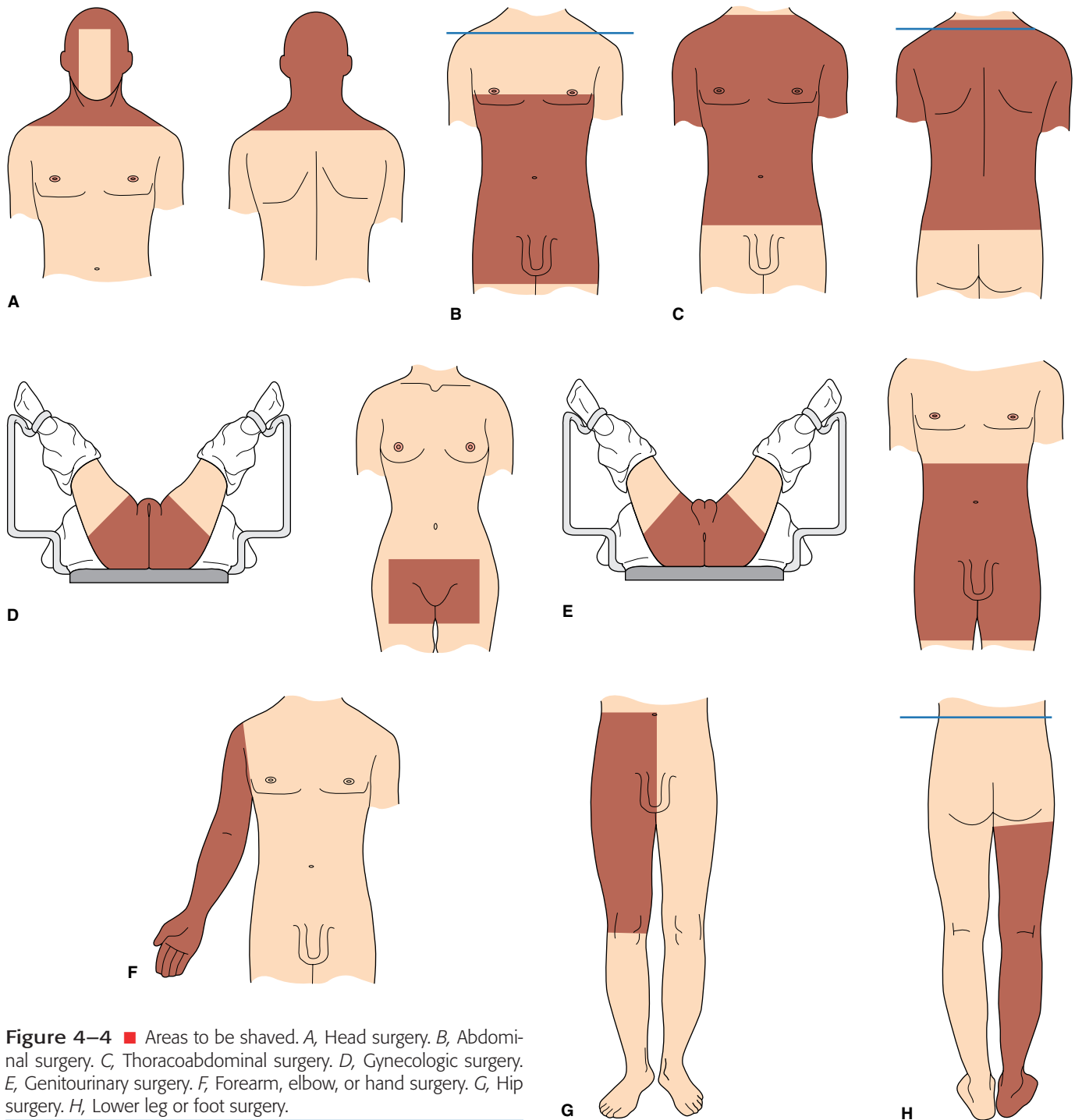


Figure 4-4 ■ Areas to be shaved. *A*, Head surgery. *B*, Abdominal surgery. *C*, Thoracoabdominal surgery. *D*, Gynecologic surgery. *E*, Genitourinary surgery. *F*, Forearm, elbow, or hand surgery. *G*, Hip surgery. *H*, Lower leg or foot surgery.

PRACTICE ALERT

Do not say anything while the client is unconscious that would be inappropriate if the client were awake. Maintain a respectful, professional demeanor throughout the operative period.

SPECIAL CONSIDERATIONS FOR THE OLDER ADULT

Because of cardiovascular and tissue changes that result from aging, surgeries longer than 2 hours place the older adult at increased risk for complications. The older adult is

more prone to hypotension, hypothermia, and hypoxemia resulting from anesthesia and the cool temperature in the operating room.

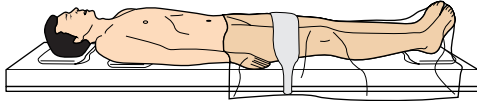
Positioning may also cause complications in the older adult. Intraoperative positioning of arthritic joints can cause postoperative joint pain unrelated to the operative site. Also, the longer the surgery, the greater the chance of decubitus ulcer (pressure sore) formation. The older client is at increased risk for developing pressure sores because of decreased subcutaneous fat tissue and reduced peripheral circulation.

TABLE 4–5 Common Surgical Positions

POSITION AND USE

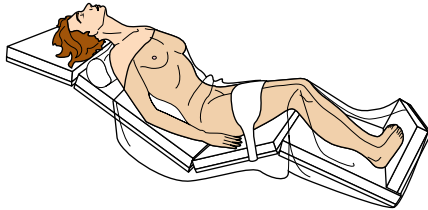
POSSIBLE ADVERSE EFFECTS AND NURSING INTERVENTIONS

- (a) The *dorsal recumbent* (or *supine*) position is used for many abdominal surgeries (e.g., colostomy and herniorrhaphy) as well as for some thoracic surgeries (e.g., open heart surgery) and some surgeries on the extremities.



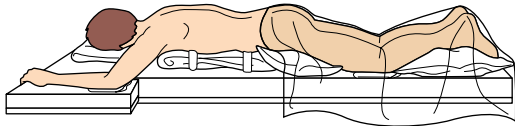
This position may cause excessive pressure on posterior bony prominences, such as the back of the head, scapulae, sacrum, and heels. Pad these areas with soft materials. To avoid compression of blood vessels and sluggish circulation, ensure that the knees are not flexed. Use trochanter rolls or other padding to avoid internal or external rotation of the hips and shoulders.

- (b) The *semisitting* position is used for surgeries on the thyroid and neck areas.



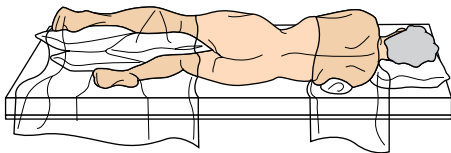
This position can lead to postural hypotension and venous pooling in the legs. It may promote skin breakdown on the buttocks. Sciatic nerve injury is possible. Assess for hypotension. Ensure that knees are not sharply flexed. Use soft padding to prevent nerve compression.

- (c) The *prone* position is used for spinal fusions and removal of hemorrhoids.



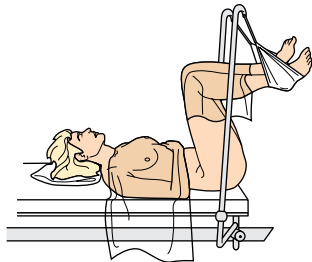
This position causes pressure on the face, knees, thighs, anterior ankles, and toes. Pad bony prominences, and support the feet under the ankles. To promote optimum respiratory function, raise the client's chest and abdomen, and support with padding. Corneal abrasion could occur if the eyes are not closed or are insufficiently padded.

- (d) The *lateral chest* position is used for some thoracic surgeries, as well as hip replacements.



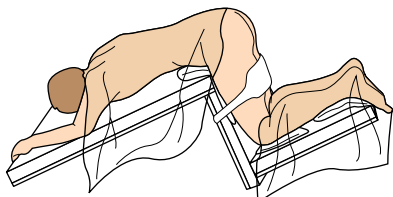
This may cause excessive pressure on the bony prominences on the side on which the client is positioned. Ensure adequate padding and support, especially of the downside arm. The weight of the upper leg may cause peroneal nerve injury on the downside leg. Both legs must therefore be padded.

- (e) The *lithotomy* position is used for gynecologic, perineal, or rectal surgeries.



This position causes an 18% decrease (from a standing position) in vital capacity of the lungs. Monitor respirations, and assess for hypoxia and dyspnea. The lithotomy position can lead to joint damage, peroneal nerve damage, and damage to peripheral blood vessels. To avoid injury, ensure adequate padding, and manipulate both legs into the stirrups simultaneously.

- (f) The *jackknife* position is used for proctologic surgeries, such as removal of hemorrhoids, and for some spinal surgeries.



This position causes a 12% decrease (from a standing position) in vital capacity of the lungs. Monitor respirations, and assess for hypoxia and dyspnea. In this position, the greatest pressure is felt at the bends in the table. Therefore, the client is supported with pads at the groin and knees, as well as at the ankles. Padding of the chest and knees helps prevent skin breakdown. Padding and proper positioning help prevent pressure on the ear, the neck, and the nerves of the upper arm.

Finally, the older adult often has some degree of hearing and/or visual impairment. These impairments coupled with a strange environment can make the operating room a frightening, disorienting place. By effectively communicating with the client, the nurse can provide support and reassurance to minimize these factors. To decrease confusion and assist in communication, hearing aids and glasses should be used when appropriate and possible.

Nutrition

Wound healing after surgery depends on adequate nutritional intake. During the immediate postoperative phase, dietary intake is withheld until evidence of peristalsis is found and the client can tolerate liquids without nausea and vomiting. While intravenous fluids maintain hydration and electrolyte balance, they do not provide nutrition. Some clients believe that intravenous fluids are the same as intravenous “feeding,” but this is a myth. Unless balanced nutrition through gastrointestinal intake can be reestablished within 3 to 4 days, parenteral hyperalimentation is critical for homeostasis and wound healing.

- Protein, calories, and vitamins are needed for wound healing and recovery from surgery.
- Low-fat, high-fiber diets are important for chronic cardiovascular fitness, but are contraindicated in the wound healing phase following surgery.
- Failure to use the gastrointestinal tract for more than 4 or 5 days allows the intestinal mucosa to atrophy, putting the client at risk for infection.

Fluid administered through peripheral veins must be isotonic or only moderately hypertonic to prevent sclerosing the

small peripheral veins. Solutions of 10% dextrose are tolerable peripherally for a short time but do not provide adequate calories for healing and maintenance. To provide adequate nutrition, central vein access must be established and solutions must be prepared with protein, carbohydrates, lipids, vitamins, and minerals. This is important for clients who have extended recovery periods without eating after surgery.

Parenteral nutrition has serious risks. Central vein access may cause infection and sepsis. Normal stimulation to the intestinal tract is lost when the parenteral approach is used alone. Using the gut is better than using the vein because it (1) prevents intestinal atrophy, which results in a very thin bowel wall poorly suited to absorb nutrients; (2) prevents bacteria and inert particles from translocating across the bowel lining into the bloodstream; (3) introduces fats and other large particles into the lymphatic circulation and stimulates the immune system; and (4) is safer and far less expensive than parenteral nutritional support (Heimburger & Weinsier, 1997; Lindgren & Ames, 2005). Education and counseling to support adequate nutritional intake should be ongoing throughout the preoperative and postoperative period.



NURSING CARE

The following section will discuss nursing care in each of the three phases of surgery. A case study at the end of the section follows one client through the postoperative experience, bringing this information together. Perioperative nursing diagnoses are provided in Box 4–2 to assist in identifying the

BOX 4–2 Examples of Perioperative Nursing Diagnoses

PREOPERATIVE

- Knowledge, Deficient
- Anxiety
- Fear
- Decisional Conflict
- Coping, Ineffective
- Sexuality Patterns, Ineffective
- Sleep Pattern, Disturbed
- Thought Processes, Disturbed
- Family Processes, Interrupted
- Spiritual Distress

INTRAOPERATIVE

- Knowledge, Deficient
- Anxiety
- Fear
- Airway Clearance, Ineffective
- Aspiration, Risk for
- Cardiac Output, Decreased
- Hypothermia
- Infection, Risk for
- Thought Processes, Disturbed
- Gas Exchange, Impaired
- Urinary Elimination, Impaired
- Fluid Volume, Deficient
- Fluid Volume, Excess
- Communication: Verbal, Impaired

POSTOPERATIVE

- Knowledge, Deficient
- Pain
- Breathing Pattern, Ineffective
- Airway Clearance, Ineffective
- Skin Integrity, Impaired
- Nutrition Imbalanced: Less than Body Requirements
- Sexuality Patterns, Ineffective
- Sleep Pattern, Disturbed
- Fatigue
- Urinary Retention
- Urinary Elimination, Impaired
- Adjustment, Impaired
- Body Image, Disturbed
- Mobility: Physical, Impaired
- Activity Intolerance, Risk for
- Injury, Risk for
- Health Maintenance, Ineffective
- Diversional Activity, Deficient
- Social Isolation
- Spiritual Distress

needs of the surgical client. This is not an exhaustive list, but it can serve as a guide in identifying possible nursing diagnoses.

Preoperative Nursing Care

The client's response to planned surgery varies greatly. When planning and implementing nursing care, consider individual psychologic and physical differences, the type of surgery, and the circumstances surrounding the need for surgery. A thorough nursing assessment is needed to determine the most appropriate care for each client undergoing surgery.

Before planning and implementing care for the surgical client, gather assessment information by taking a nursing history and performing a physical examination. Use this information to establish baseline data, identify physical needs, determine teaching needs and psychologic support for the client and family, and prioritize nursing care. The type of surgical procedure directs the assessment and intervention planned by the nurse.

PRACTICE ALERT

Be sure to assess information about use of over-the-counter medications including herbal supplements. These drugs can interact with medications administered in the perioperative period.

Surgery is a significant and stressful event. Regardless of the nature of the surgery (whether major or minor), the client and family will be anxious. Some clients and their families seek care from a spiritual provider during this time. The degree of anxiety they will feel is not necessarily proportional to the magnitude of the surgical procedure. For example, a client scheduled to have a biopsy to rule out cancer, which is considered minor surgery, may be more anxious than a client undergoing gallbladder removal, which is considered major surgery.

The nurse's ability to listen actively to both verbal and non-verbal messages is imperative to establishing a trusting relationship with the client and family. Therapeutic communication can help the client and family identify fears and concerns. The nurse can then plan nursing interventions and supportive care to reduce the client's anxiety level and assist the client to cope successfully with the stressors encountered during the perioperative period.

Preoperative Client and Family Teaching

Client teaching is an essential nursing responsibility in the preoperative period. Client education and emotional support have a positive effect on the client's physical and psychologic well-being, both before and after surgery. In an analysis of 102 studies, surgical clients receiving client education and/or supportive interventions had less pain and anxiety, experienced fewer complications, were discharged sooner, were more satisfied with their care, and returned to normal activities sooner than clients who did not receive this type of care. These positive outcomes may be attributed in part to the sense of control the client gains through the nurse's teaching.

Client teaching should begin as soon as the client learns of the upcoming surgery. Teaching may begin as early as in the physician's office or at the time of preadmission testing. Although education continues during postoperative care, most

teaching is done before surgery, because pain and the effects of anesthesia can greatly diminish the client's ability to learn.

The amount of information desired varies from client to client. Therefore, assess the client's need for and readiness to accept information. The teaching will be directed in part by the particular surgical procedure that is being performed and by the type of anesthesia. The information in Box 4–3 is relevant to most clients undergoing major surgery.

In addition to teaching the client and family about measures that will decrease the risk of complications, provide other preoperative information to prepare the client and family for surgery. This information should include the following:

- Diagnostic tests—reasons and preparations
- Arrival time if surgery is scheduled in early morning
- Preparations for surgery after midnight prior to a morning surgery, skin preparation, indwelling catheter or bladder elimination, start of intravenous infusion, preoperative medication, handling of valuables (rings, watch, money)
- Sedative/hypnotic medication to be taken the night before surgery to promote rest and sleep
- Counseling on whether to take significant medications the morning of surgery
- Informed consent
- Expected timetable for surgery and the recovery room
- Method to inform family of progress throughout surgery
- Transfer to the surgery department
- Location of the surgical waiting room
- Transfer to recovery room
- Anticipated postoperative routine and devices or equipment (drains, tubes, equipment for IV infusions, oxygen or humidifying mask, dressings, splints, casts)
- Plans for postoperative pain control

PRACTICE ALERT

Researchers report that many clients experience unnecessarily long preoperative fasts.

The American Society of Anesthesiologists provides guidelines for preoperative fasting in healthy clients undergoing elective procedures; they are available online. Withdrawal from caffeine in beverages such as coffee or colas may cause headaches and irritability. Dehydration, hypovolemia, and hypoglycemia are other recognized side effects. Thirst, worry, and hunger are reported by clients to be related to fasting. Fasting does not ensure that the stomach will be empty or that the gastric contents will be less acidic.

Preoperative Client Preparation

A preoperative surgical checklist serves as an outline for finalizing preparation of the client for surgery in most institutions. Complete the checklist before the client is transported to surgery. Nursing responsibilities the day of surgery are as follows:

- Assist with bathing, grooming, and changing into operating room gown.
- Ensure that the client takes nothing by mouth (NPO). Provide additional teaching, and reinforce prior teaching.

BOX 4–3 Preoperative Client Teaching

Diaphragmatic Breathing Exercise

Diaphragmatic (abdominal) breathing exercises are taught to the client who is at risk for developing pulmonary complications, such as atelectasis or pneumonia. Risk factors for pulmonary complications include general anesthesia, abdominal or thoracic surgery, history of smoking, chronic lung disease, obesity, and advanced age.

In diaphragmatic breathing, the client inspires deeply while allowing the abdomen to expand outward. On expiration, the abdomen contracts inward as air from the lungs is expelled.

1. Explain to the client that the diaphragm is a muscle that makes up the floor of the abdominal cavity and assists in breathing. The purpose of diaphragmatic breathing is to promote lung expansion and ventilation and enhance blood oxygenation.
2. Position the client in a high or semi-Fowler's position (see figure below).
3. Ask the client to place the hands lightly on the abdomen.
4. Instruct the client to breathe in deeply through the nose, allowing the chest and abdomen to expand.
5. Have the client hold the breath for a count of 5.
6. Tell the client to exhale completely through pursed (puckered) lips, allowing the chest and abdomen to deflate.
7. Have the client repeat the exercise five times consecutively.



Diaphragmatic breathing exercise.

Encourage the client to perform diaphragmatic breathing exercises every 1 to 2 waking hours, depending on the client's needs and institutional protocol.

Coughing Exercise

Coughing exercises are also taught to the client who is at risk for developing pulmonary complications. The purpose of coughing is to loosen, mobilize, and remove pulmonary secretions. Splinting the incision decreases the physical and psychologic discomfort associated with coughing.

1. Assist the client in following steps 1 through 4 for diaphragmatic breathing.
2. Ask the client to splint the incision with interlocked hand or pillow (see figure below).
3. Tell the client to take three deep breaths and then cough forcefully.
4. Have the client repeat the exercise five times consecutively every 2 hours while awake, taking short rest periods between coughs, if necessary.



Splinting abdomen while coughing.

- Remove nail polish, lipstick, and makeup to facilitate circulatory assessment during and after surgery.
- Ensure that identification, blood, and allergy bands are correct, legible, and secure.
- Remove hair pins and jewelry; a wedding ring may be worn if it is removed from the finger, covered with gauze, replaced, and then taped to the finger.
- Complete skin or bowel preparation as ordered.
- Insert an indwelling catheter, intravenous line, or nasogastric tube as ordered.
- Remove dentures, artificial eye, and contact lenses, and store them in a safe place.

- Leave a hearing aid in place if the client cannot hear without it, and notify the operating room nurse.
- Verify that the informed consent has been signed prior to administering preoperative medications.
- Weigh the client and record height and weight in the chart (for dosage of anesthesia).
- Verify that all ordered diagnostic test reports are in the chart.
- Have the client empty the bladder immediately before the preoperative medication is administered (unless an indwelling catheter is in place).
- Administer preoperative medication as scheduled (refer to “Medications” earlier in the chapter and Table 4–4).

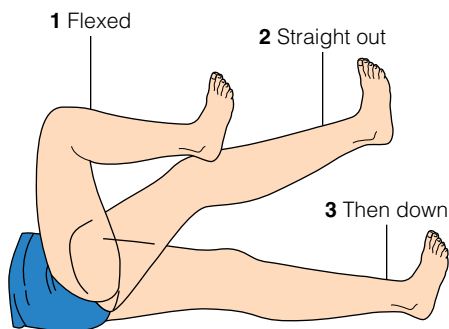
BOX 4–3 Preoperative Client Teaching (continued)**Leg, Ankle, and Foot Exercises**

Leg exercises are taught to the client who is at risk for developing thrombophlebitis (inflammation of a vein, which is associated with the formation of blood clots). Risk factors for developing thrombophlebitis include decreased mobility preoperatively and/or postoperatively; a history of difficulties with peripheral circulation; and cardiovascular, pelvic, or lower extremity surgeries.

The purpose of leg exercises is to promote venous blood return from the extremities. As the leg muscles contract and relax, blood is pumped back to the heart, promoting cardiac output and reducing venous stasis. These exercises also maintain muscle tone and range of motion, which facilitate early ambulation.

Teach the client to perform the following exercises while lying in bed:

1. Muscle pumping exercise: Contract and relax calf and thigh muscles at least 10 times consecutively.
2. Leg exercises:
 - a. Bend the knee and raise it toward the chest (see figure below).
 - b. Straighten out leg and hold for a few seconds before lowering the leg back to the bed.
 - c. Repeat exercise five times consecutively prior to alternating to the other foot.
3. Ankle and foot exercises:
 - a. Rotate both ankles by making complete circles, first to the right and then to the left (see figure below).
 - b. Repeat five times and then relax.
 - c. With feet together, point toes toward the head and then to the foot of the bed (see figure below).
 - d. Repeat this pumping action 10 times, and then relax.



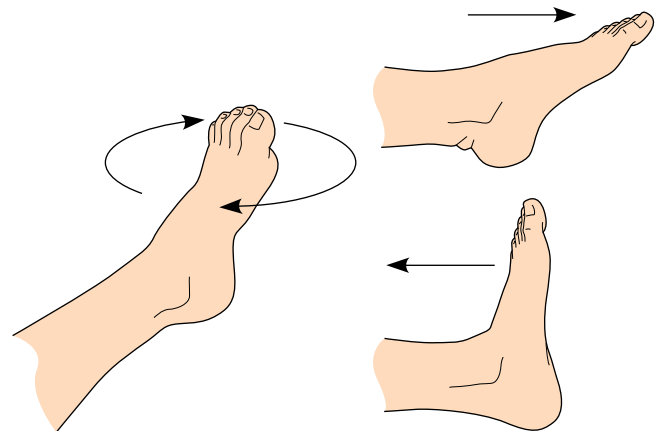
Leg exercises.

Encourage the client to perform leg, ankle, and foot exercises every 1 to 2 hours while awake, depending on the client's needs and ambulatory status, the physician's preference, and institutional protocol.

Turning in Bed

The client who is at risk for circulatory, respiratory, or gastrointestinal dysfunction following surgery is taught to turn in bed. Although this may be a simple task prior to surgery, after surgery (particularly after abdominal surgery) the client may find it a difficult procedure. To make the procedure more comfortable, the client may need to splint the incision by using the hand placed on a small pillow or blanket. Additionally, the client should be taught that analgesics can be given to ease postoperative discomfort involved with turning. Encourage the client to turn every 2 hours while awake.

1. Tell the client to grasp the side rail toward the direction to be turned, to rest the opposite foot on the mattress, and to bend the knee.
2. Instruct the client to roll over in one smooth motion by pulling on the side rail while pushing off with the bent knee.
3. Pillows may need to be positioned behind the client's back to help the client maintain a side-lying position. The older client may also need padding over pressure points between the knees and ankles to decrease the chance of decubitus ulcer formation from pressure.



Ankle and foot exercises.

- Ensure the safety of the client once the medication has been given by placing the client on bed rest with raised side rails and by placing the call light within reach.
- Obtain and record vital signs.
- Provide ongoing supportive care to the client and the client's family.
- Document all preoperative care in the appropriate location, such as the preoperative surgical checklist, the medication record, and the narrative preoperative nursing notes.
- Verify with the surgical personnel the client's identity, and verify that all client information is documented appropriately.
- Help the surgical personnel transfer the client from the bed to the stretcher.

- Prepare the client's room for postoperative care, including making the surgical bed and ensuring that the anticipated supplies and equipment are in the room.

Intraoperative Nursing Care

The intraoperative phase of surgery begins when the client enters the operating room and ends when the client is transferred to the postanesthesia care unit. Nursing care in this phase focuses on keeping the client and the environment safe and providing physiologic monitoring and psychologic support. Circulating nurses and scrub nurses, according to specific role definitions, support and care for the client and assist the surgeons.

PRACTICE ALERT

Objects on the sterile drape are considered sterile. Remain a minimum of 12 inches away from draped tables and sterile fields to avoid contamination if you are not attired in sterile gown and gloves.

Postoperative Nursing Care

Immediate Postoperative Care

Immediate postoperative care begins when the client has been transferred from the operating room to the PACU. The PACU nurse is part of the surgical team and monitors the client's vital signs and surgical site to determine the response to the surgical procedure and to detect significant changes. Assessing mental status and level of consciousness is another ongoing nursing responsibility, and the client may require repeated orientation to time, place, and person. Emotional support also is essential, because the client is in a vulnerable and dependent position. Assessing and evaluating hydration status by monitoring intake and output is crucial to detecting cardiovascular or renal complications. In addition, the PACU nurse assesses the client's pain level. Careful administration of analgesics provides comfort without compounding the potential side effects from the anesthesia.

Care When the Client Is Stable

When awake and after being stabilized, the client is transferred to his or her room. The PACU nurse communicates information about the client's condition and postoperative orders to the floor nurse prior to the client's arrival. This prepares the floor nurse for additional problems or needed equipment.

Immediate and continuing assessment is essential to detect and/or prevent complications. In documenting assessment findings, the nurse completes a flow record of the individual client's situation. Baseline data are obtained and compared with preoperative data. A postoperative head-to-toe assessment includes but may not be limited to the following:

- General appearance
- Vital signs
- Level of consciousness
- Emotional status
- Quantity of respirations
- Skin color and temperature
- Discomfort/pain
- Nausea/vomiting
- Type of intravenous fluids and flow rate
- Dressing site
- Drainage on the dressing and/or bed linen
- Urinary output (catheter or ability to urinate)
- Ability to move all extremities.

The hospital policy or physician's orders dictate the frequency of follow-up assessments. After major surgery, the nurse generally assesses the client every 15 minutes during the first hour and, if the client is stable, every 30 minutes for the next 2 hours, and then every hour during the subsequent 4 hours. Assessments are then carried out every 4 hours, subject to change according to the client's condition and protocol for

the particular surgical procedure. It is critically important to inform the surgeon immediately if the assessment reveals any signs of impending shock or other life-threatening changes.

After carrying out the initial assessment and ensuring the client's safety by lowering the bed, raising the side rails, and placing the call light within reach, the nurse notes the physician's postoperative orders. These orders guide the nurse in the care of the postoperative client. For example, the orders specify activity level, diet, medications for pain and nausea, antibiotics, continuation of preoperative medications, frequency of vital sign assessments, administration of intravenous fluids, and laboratory tests such as hemoglobin and potassium level. In most institutions, orders written prior to surgery must be re-ordered following surgery because the client's condition is presumed to have changed.


Nursing Care of Common Postoperative Complications

Several factors place the client at risk for postoperative complications. Nursing care before, during, and after surgery is aimed at preventing and/or minimizing the effects of these complications.

Preoperative care and teaching to decrease postoperative complications have been discussed. The following section addresses postoperative cardiovascular, respiratory, and wound complications, and problems associated with elimination.

Cardiovascular Complications

Common postoperative cardiovascular complications include shock, hemorrhage, deep venous thrombosis, and pulmonary embolism.

SHOCK Shock is a life-threatening postoperative complication. It results from an insufficient blood flow to vital organs, an inability to use oxygen and nutrients, or the inability to rid tissues of waste material. Hypovolemic shock, the most common type in the postoperative client, results from a decrease in circulating fluid volume. Decreased fluid volume develops with blood or plasma loss or, less commonly, from severe prolonged vomiting or diarrhea. Symptoms vary according to the severity of the shock; the greater the loss of fluid volume, the more severe the symptoms. Chapter 11  provides a detailed discussion of nursing care of the client with various types of shock.

HEMORRHAGE Hemorrhage is an excessive loss of blood. A concealed hemorrhage occurs internally from a blood vessel that is no longer sutured or cauterized or from a drainage tube that has eroded a blood vessel. An obvious hemorrhage occurs externally from a dislodged or ill-formed clot at the wound. Hemorrhage also may result from abnormalities in the blood's ability to clot; these abnormalities may result from a pathologic condition, or they may be a side effect of medications.

Hemorrhage from a venous source oozes out quickly and is dark red, whereas an arterial hemorrhage is characterized by bright red spurts of blood pulsating with each heartbeat.

Whether the hemorrhage is from a venous or an arterial source, hypovolemic shock will occur if sufficient blood is lost from the circulation.

Common assessment with hemorrhage depends on the amount and rate of blood loss. Restlessness and anxiety are observed in the early stage of hemorrhage. Frank bleeding will be present if the hemorrhage is external. The client will have symptoms characteristic of shock.

Care of the client who is hemorrhaging centers around stopping the bleeding and replenishing the circulating blood volume. Nursing care includes providing care for shock and one or more of the following:

- Applying one or more sterile gauze pads and a snug pressure dressing to the area
- Applying pressure with gloved hands (may be necessary for severe external bleeding)
- Preparing client and family for emergency surgery (in severe situations when bleeding cannot be stopped).

DEEP VEIN THROMBOSIS Deep venous thrombosis (DVT) is the formation of a thrombus (blood clot) in association with inflammation in deep veins. This complication most often occurs in the lower extremities of the postoperative client. It may result from the combination of several factors, including trauma during surgery, pressure applied under the knees, and sluggish blood flow during and after surgery. Clients particularly at risk for developing DVT include those who are over age 40 and who:

- Have undergone orthopedic surgery to lower extremities; urologic, gynecologic, or obstetric surgeries; or neurosurgery.
- Have varicose veins.
- Have a history of thrombophlebitis or pulmonary emboli.
- Are obese.
- Have an infection.
- Have a malignancy.

Common assessment findings reveal pain or cramping in the involved calf or thigh. Redness and edema of the entire extremity may occur along with a slightly elevated temperature. The client may have a positive Homans' sign (pain in the calf on dorsiflexion of the affected foot).

Nursing care of the client with DVT focuses on preventing a portion of the clot from dislodging and becoming an embolus (traveling blood clot) circulating to the heart, brain, or lungs; preventing other clots from forming; and supporting the client's own physiologic mechanism for dissolving clots. Nursing care includes the following measures:

- Administer anticoagulants and analgesics as prescribed. (NSAIDs are not usually given along with anticoagulants, because doing so increases the anticoagulant effects.)
- Monitor laboratory values for clotting times.
- Maintain bed rest and keep affected extremity at or above heart level.
- Apply thigh-high antiemboli stockings or devices to stimulate venous return.
- Ensure that the affected area is not rubbed or massaged.
- Apply heat as prescribed.
- Record bilateral calf or thigh circumferences every shift.


- Teach and support the client and family.
- Assess color and temperature of involved extremity every shift.

PULMONARY EMBOLISM A pulmonary embolism is a dislodged blood clot or other substance that lodges in a pulmonary artery. For the postoperative client with DVT, the threat that a portion of the thrombus may dislodge from the vein wall and travel to the lung, heart, or brain is a constant concern. Early detection of this potentially life-threatening complication depends on the nurse's astute, continuing assessment of the postoperative client.

Common assessment findings of the client experiencing a pulmonary embolism include mild to moderate dyspnea, chest pain, diaphoresis, anxiety, restlessness, rapid respirations and pulse, dysrhythmias, cough, and cyanosis. The severity of the symptoms is determined by the degree of pulmonary vascular blockage. Sudden death can occur if a major pulmonary artery becomes completely blocked.

Stabilizing respiratory and cardiovascular functioning while preventing the formation of additional emboli is of utmost importance in the care of the client with a pulmonary embolism. Nursing care includes the following measures:

- Immediately notify the physician and nursing supervisor.
- Frequently assess and record general condition and vital signs.
- Maintain the client on bed rest, and keep the head of the bed elevated.
- Provide oxygen as ordered and monitor pulse oximetry.
- Administer prescribed intravenous fluids to maintain fluid balance while preventing fluid overload.
- Administer prescribed anticoagulants.
- Maintain comfort by administering analgesics and sedatives (use caution to prevent respiratory depression).
- Provide supportive measures for the client and family.

Refer to Chapter 39  for a detailed discussion of pulmonary embolism.

Respiratory Complications


Common postoperative respiratory complications include pneumonia and atelectasis.

PNEUMONIA Pneumonia is an inflammation of lung tissue. Inflammation is caused either by a microbial infection or by a foreign substance in the lung, which leads to an infection. Numerous factors may be involved in the development of pneumonia, including aspiration infection, retained pulmonary secretions, failure to cough deeply, and impaired cough reflex and decreased mobility.

Common assessment findings of the postoperative client with pneumonia are as follows:

- High fever
- Rapid pulse and respirations
- Chills (may be present initially)
- Productive cough (may be present depending on the type of pneumonia)
- Dyspnea
- Chest pain
- Crackles and wheezes.

Treating the pulmonary infection, supporting the client's respiratory efforts, promoting lung expansion, and preventing the organisms' spread are the goals in the care of the client with pneumonia. Nursing care includes the following measures:

- Obtain sputum specimens for culture and sensitivity testing.
 - Position client with the head of the bed elevated.
 - Encourage the client to turn, cough, and perform deep-breathing exercises at least every 2 hours.
 - Assist with incentive spirometry, intermittent positive pressure breathing (IPPB), and/or nebulizer treatments as ordered.
 - Ambulate client as condition permits and as prescribed.
 - Administer oxygen as ordered.
 - Assess vital signs, breath sounds, and general condition.
 - Maintain hydration to help liquefy pulmonary secretions.
 - Administer antibiotics, expectorants, antipyretics, and analgesics as ordered.
 - Provide or assist with frequent oral hygiene.
 - Prevent the spread of microorganisms by teaching proper disposal of tissues, covering mouth when coughing, and good hand washing technique.
 - Provide supportive measures for the client and family.
- Chapter 39  provides a detailed discussion of pneumonia.

ATELECTASIS Atelectasis is an incomplete expansion or collapse of lung tissue resulting in inadequate ventilation and retention of pulmonary secretions. Common assessment findings include dyspnea, diminished breath sounds over the affected area, anxiety, restlessness, crackles, and cyanosis.

Promoting lung expansion and systemic oxygenation of tissues is a goal in the care of the client with atelectasis. Nursing care includes these tasks:

- Position the client with the head of bed elevated.
- Administer oxygen as prescribed.
- Encourage coughing, turning, and deep breathing every 2 hours.
- Ambulate the client as condition permits and as prescribed.
- Assist with incentive spirometry or other pulmonary exercises, such as inflating a balloon, as ordered.
- Administer analgesics as prescribed.
- Promote hydration.
- Provide supportive measures to the client and family.

Wound Complications

Discussion of the complications associated with surgical wounds follows an overview of wound healing, wound drainage, and nursing care of wounds.

Wounds heal by either *primary*, *secondary*, or *tertiary intention* (Figure 4–5 ■). Healing by primary intention takes place when the wound is uncomplicated and clean and has sustained little tissue loss. The edges of the incision are well approximated (have come together well) with sutures, staples, or superglue for drain holes or superficial wounds (Zide, 2005). This type of surgical incision heals quickly, and very little scarring is expected.

Secondary intention refers to the healing that occurs when the wound is large, gaping, and irregular. Tissue loss prevents wound edges from approximating; therefore, granulation fills in the wound. This type of wound takes longer to heal, is more prone to infection, and develops more scar tissue.

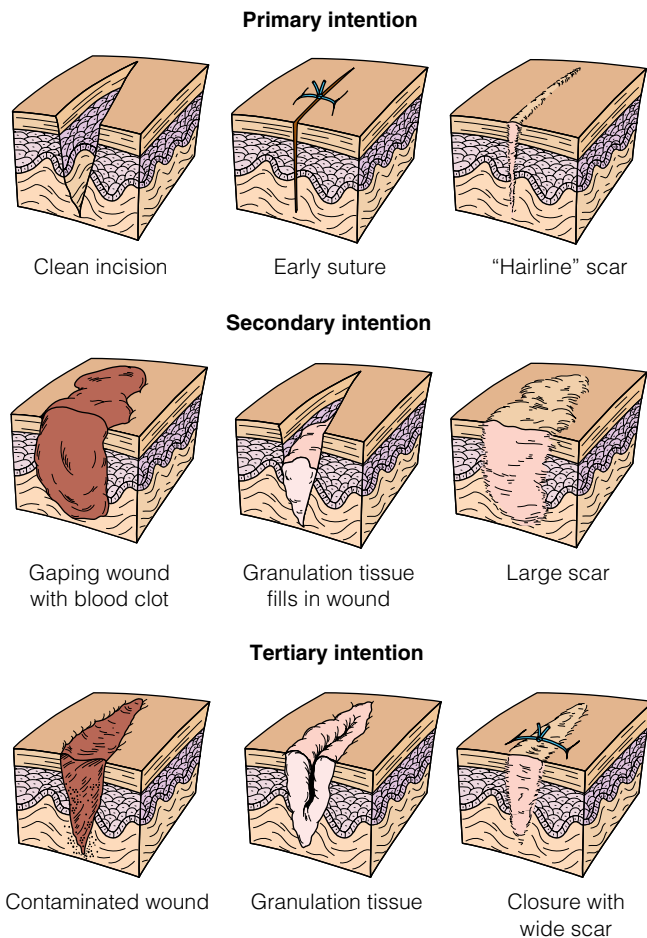


Figure 4–5 ■ Wound healing by primary, secondary, and tertiary intention.

Stages of Wound Healing

- *Stage I: from surgery through day 2.* Inflammatory process occurs to prepare the surrounding tissue for healing. Blood vessels constrict, and clotting occurs. Vasodilation follows, bringing more blood, white blood cells, and fibroblastin to the wound site. Epithelial cells begin to form and reestablish blood flow in the wound tissue. A mild temperature elevation is normal.
- *Stage II: day 3 through day 14 following surgery.* Fewer white blood cells are present. Collagen tissue forms in the wound tissue. Granulation tissue, red with a rich blood supply, is established.
- *Stage III: day 15 to week 6 following surgery.* Collagen fibers continue to strengthen the wound. As the blood supply decreases, the scar tissue appears pink and somewhat raised.
- *Stage IV: several months to a year following surgery.* As the wound tissue constricts, the scar becomes flat, smaller, and white.

If enough time passes before a wound is sutured, healing by tertiary intention occurs. Infection is more likely to take place. Because the wound edges are not approximated, tissue is regenerated by the granulation process. Closure of the wound results in a wide scar.

From the time the surgical incision is made until the wound is completely healed, all wounds progress through four stages of healing. However, healing time varies according to many factors, such as age, nutritional status, general health, and the type and location of the wound. Figure 4–5 provides a summary of the stages of wound healing.

Wound drainage (exudate) results from the inflammatory process in the first two stages of wound healing. The drainage is from the rich blood supply that surrounds the wound tissue and is composed of escaped fluid and cells. The drainage is described as serous, sanguineous, or purulent.

- Serous drainage contains mostly the clear serous portion of the blood. The drainage appears clear or slightly yellow and is thin in consistency.
- Sanguineous drainage contains a combination of serum and red blood cells and has a thick, reddish appearance. This is the most common type of drainage from a noncomplicated surgical wound.

- Purulent drainage is composed of white blood cells, tissue debris, and bacteria. Purulent drainage is the result of infection and tends to be of a thicker consistency, with various colors specific to the type of organism. It also may have an unpleasant odor.

Box 4–4 describes and illustrates various types of wound drainage devices. These devices decrease pressure in the wound area by removing excess fluid, which promotes healing and decreases complications.

Nursing care of the postoperative client with a surgical wound focuses on preventing and monitoring for wound complications. The nurse assumes a leading role in supporting the wound healing process, providing emotional support to the client and teaching wound care to the client.

Common assessment findings of an infected wound include pain; purulent, odorous discharge and redness; warmth; tenderness; and edema around the edges of the incision. Additionally, the client may have a fever, chills, and increased respiratory and pulse rates. Nursing care includes the following measures:

- Maintain medical asepsis (e.g., by using good hand washing technique).
- Follow Centers for Disease Control and Prevention guidelines for wound care.

BOX 4–4 Wound Drainage Devices

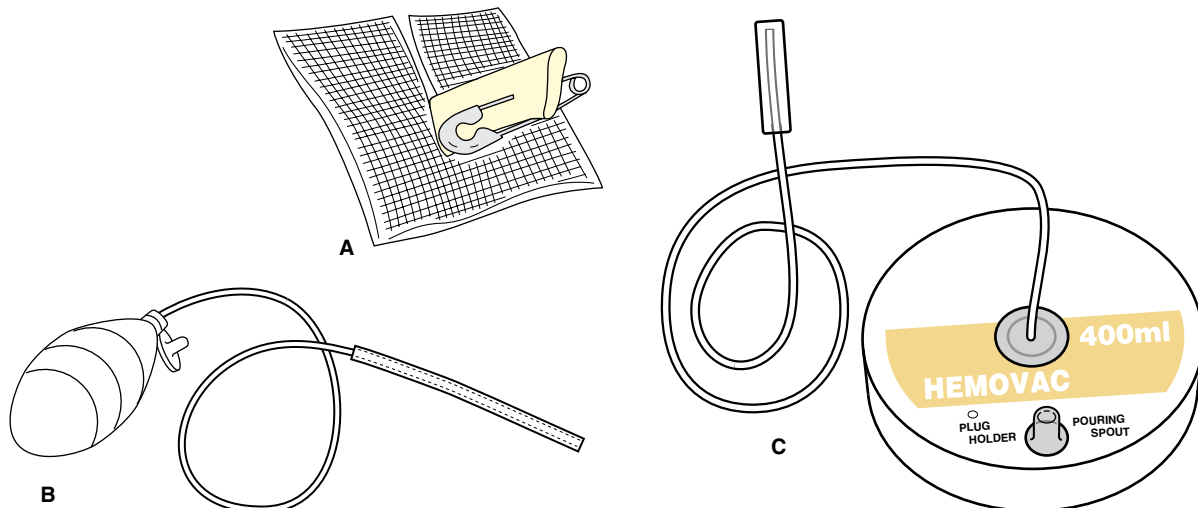
A Penrose drain, used for passive wound drainage, promotes healing from the inside to the outside (see figure *A* below). The use of the drain decreases the chance of abscess formation. The safety pin in the Penrose drain prevents the exposed end from slipping down into the wound. Wound care focuses on cleaning around the drain with a prescribed solution, such as sterile normal saline, and replacing the precut gauze dressing as necessary to keep the surrounding skin dry and encourage further drainage. An absorbent dressing is placed over the drain and gauze (not shown).

Wound suction devices promote drainage of fluid from the incision site, decreasing pressure on healing tissues and reducing ab-

cess formation. Shown are the Jackson-Pratt and Hemovac wound suction devices (see figures *B* and *C* below).

The frequency with which the nurse empties the device depends on the time elapsed since surgery, type of surgery, amount of drainage, and hospital policy. For example, immediately after surgery the nurse may empty the device every 15 to 60 minutes. With time, as drainage decreases, the device is emptied every 2 to 4 hours (per hospital policy). Amount, color, consistency, and odor of drainage are documented.

Usually, the drain is removed on the second to fourth day after surgery. Removal causes minor client discomfort. The drain site is cleaned, superglue may be applied to the hole, and a sterile dressing is applied.



Wound drainage devices. *A*, Penrose passive wound drainage device. *B*, Jackson-Pratt wound suction device. *C*, Hemovac wound suction device.

- Observe aseptic technique during dressing changes and handling of tubes and drains.
- Assess vital signs, especially temperature.
- Evaluate the characteristics of wound discharge (color, odor, and amount).
- Assess the condition of the incision (approximation of the edges, sutures, staples, or drains).
- Clean, irrigate, and pack the wound in the prescribed manner. Sterile normal saline is often prescribed; povidone-iodine (Betadine) is no longer recommended for wound care.
- Maintain the client's hydration and nutritional status.
- Culture the wound prior to beginning antibiotic therapy.
- Administer antibiotics and antipyretics as prescribed.
- Provide supportive measures to client and family.

Dehiscence is a separation in the layers of the incisional wound (Figure 4–6A ■). Treatment depends on the extent of wound disruption. If the dehiscence is extensive, the incision must be resutured in surgery. **Evisceration** is the protrusion of body organs from a wound dehiscence (Figure 4–6B). These serious complications may result from delayed wound healing or may occur immediately following surgery. They also may occur after forceful straining (coughing, sneezing, or vomiting). When dehiscence occurs, immediately cover the wound with a sterile dressing moistened with normal saline. Emergency surgery is performed to repair these conditions.

Either the nurse, physician, physician assistant (PA), or nurse practitioner (NP) removes sutures or staples after the wound has healed sufficiently (usually 5 to 10 days after surgery). Removal is performed using medical aseptic technique. Additional support may be provided to the incision by apply-

ing strips of tape (or Steri-Strips) as directed by institutional policy or by the physician.

Although widely used, wound vacuums are not used to accelerate healing when normal healing is expected. When complications occur in surgically created wounds or a wound occurs traumatically, accelerated granulation stimulated by a wound vacuum may be beneficial. The wound vacuum, along with appropriate antimicrobial therapy and surgery, speeds healing (Antony & Terrazas, 2004).

Complications Associated with Elimination

Common postoperative complications associated with elimination include urinary retention and altered bowel elimination. The inability to urinate with urinary retention may occur postoperatively as a result of the recumbent position, effects of anesthesia and narcotics, inactivity, altered fluid balance, nervous tension, or surgical manipulation in the pelvic area. Nursing care centers on promoting normal urinary elimination and includes the following measures:

- Assess for bladder distention if the client has not voided within 7 to 8 hours after surgery or if the client is urinating small amounts frequently.
- Assess the amount of urine in the bladder with a portable ultrasound scanner. This noninvasive procedure provides information to prevent unnecessary catheterization and decreases the potential for urinary tract infections and urethral trauma from repeated catheterizations.
- Monitor intake and output.
- Maintain intravenous infusion if fluids are prescribed.
- Increase daily oral fluid intake to 2500 to 3000 mL if the client's condition permits.
- Insert a straight or indwelling catheter if ordered.
- Promote normal urinary elimination by:
 - a. Assisting and providing privacy when the client uses a bedpan.
 - b. Helping the client use the bedside commode or walk to the bathroom.
 - c. Assisting male clients to stand to void.
 - d. Pouring a measured amount of warm water over the perineal area. (If urination occurs, subtract the amount of water from the total amount for an accurate output measurement.)

Bowel elimination frequently is altered after abdominal or pelvic surgery and sometimes after other surgeries. Return to normal gastrointestinal function may be delayed by general anesthesia, narcotic analgesia, decreased mobility, or altered fluid and food intake during the perioperative period.

Nursing care centers on the return of normal bowel function and includes the following measures:

- Assess for the return of normal peristalsis:
 - a. Auscultate bowel sounds every 4 hours while the client is awake.
 - b. Assess the abdomen for distention. (A distended abdomen with absent or high-pitched bowel sounds may indicate paralytic ileus.)
 - c. Determine whether the client is passing flatus.
 - d. Monitor for passage of stool, including amount and consistency.

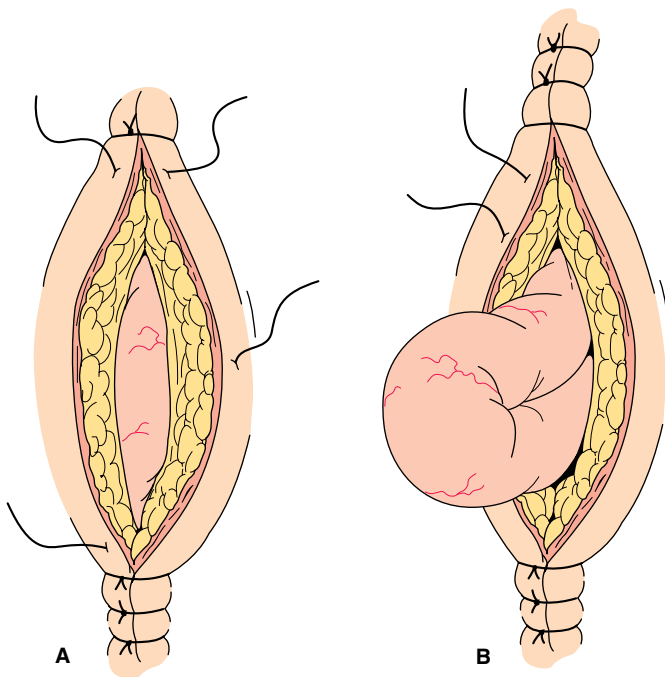


Figure 4–6 ■ Wound complications. *A*, Dehiscence is a disruption in the incision resulting in a separation of the layers of the wound. *B*, Evisceration is a protrusion of a body organ through a surgical incision.

- Encourage early ambulation within prescribed limits.
- Facilitate a daily fluid intake of 2500 to 3000 mL (unless contraindicated).
- Provide privacy when the client is using the bedpan, bedside commode, or bathroom.

If no bowel movement has occurred within 3 to 4 days after surgery, a suppository or an enema may be ordered.

Special Considerations for Older Adults

Physiologic, cognitive, and psychosocial changes associated with the aging process place the older adult at increased risk for postoperative complications. These age-related changes with selected nursing interventions are summarized in Table 4–6. With an ever-increasing population of older adults, particularly the very old, the nurse must be aware of these normal changes and modify nursing care accordingly in an effort to provide safe, supportive care.

Managing Acute Postoperative Pain

Pain is expected after surgery. It is neither realistic nor practical to eliminate postoperative pain completely. Nevertheless, the client should receive substantial relief from and control of this discomfort. Controlling postoperative pain not only promotes comfort but also facilitates coughing, turning, deep-

breathing exercises, earlier ambulation, and decreased length of hospitalization, resulting in fewer postoperative complications, and therefore reducing healthcare costs. Despite the apparent benefits and methods of effective pain control and improved understanding of pain physiology, many postoperative clients do not receive adequate pain relief or control (MacLellan, 2004; Schechter, 2004).

Managing acute postoperative pain is an important nursing role before, during, and after surgery. Successful pain management involves the cooperative efforts of the client, physician, and nurse. The American Society of Anesthesiologists suggests six specific guidelines for perioperative pain management. These include education and training for healthcare providers, monitoring of patient outcomes, 24-hour availability of anesthesiologists providing perioperative pain management, and use of a dedicated acute pain service. Preoperatively, the client should learn how much pain to anticipate and what methods are available to control pain. After discussing options with the client, healthcare providers must respect the client's personal preferences.

Postoperative medications were discussed earlier in the chapter. Various nonpharmacologic approaches to pain management are used alone or in combination to control acute postoperative pain. Relaxation, music, distraction, and imagery techniques can decrease mild pain and anxiety. Massage and the

TABLE 4–6 Nursing Interventions for Older Surgical Clients

SYSTEM	AGE-RELATED CHANGES	NURSING INTERVENTIONS
General appearance	Change in height, weight, and fat distribution	Assess physical parameters. Provide for warmth. Turn frequently.
Integument	Diminished integrity secondary to loss of subcutaneous fat and decreased oil production, elasticity, and hydration	Provide careful preoperative preparation to avoid trauma. Use other means to assess oxygenation and hydration, such as evaluation of mucous membranes, laboratory studies, and urine output.
Sensory-perceptual	Decline in vision and hearing ability; dryness of mouth	Compensate for sensory deficits: speak low, not loud; minimize noise in environment; provide adequate room light; stay within client's field of vision when speaking; encourage client to wear hearing aid to the operating room. Provide comfort measures when NPO.
Respiratory	Decreased efficiency of cough reflex and decreased aeration of lung fields	Teach and encourage coughing and diaphragmatic breathing exercises. Assess baseline parameters. Constantly monitor lung sounds and respiratory status.
Cardiovascular	Less efficient, decreased adaptation to stress	Monitor for hypotension and shock. Assess for thrombus formation, cardiac dysrhythmias, peripheral pulses, and edema.
Gastrointestinal	Decline in gastric motility	Encourage intake of adequate fluids, nutritious meals, soft diet. Assist with feeding; monitor bowel function.
Genitourinary	Decreased efficiency of kidney; loss of bladder control	Monitor I&O and electrolyte levels. Assess for drug side effects. Assist with voiding as needed.
Musculoskeletal	Stiffness of joints; decrease in strength; brittleness of bones	Carefully position on OR table. Move carefully and gently. Prevent pressure sores.
Cognitive-psychosocial	Decreased reaction time; stable intellectual ability; proneness to delirium and altered mental status while in hospital	Provide ample time for making decisions. Implement safety measures. Talk to client as adult, not as child. Orient frequently.

Source: Adapted from "Perioperative Nursing Care for the Elderly Surgical Patient" by C. Dellasea and C. Burgunder, 1991, *Today's O.R. Nurse*, 13(6), 12–17.

application of heat or cold can also relieve postoperative pain (McRee et al., 2003). Transcutaneous electrical nerve stimulation (TENS) has been used successfully to decrease postoperative incisional pain. Other approaches include acupuncture, acupressure, and therapeutic touch. Additional information on pain management techniques is found in Chapter 9 ∞.

Opioid dosage requirements vary greatly from one client to another and by the route they are taken. Remember that oral doses of analgesics are not equal to parenteral doses. Oral doses need to be higher to provide **equianalgesia**. (See Table 9–4 regarding equianalgesics.)

The client's input and participation in assessing pain and pain relief is essential to a successful pain control regime. For example, the client can rate the pain on a scale of 0 to 10 (where 0 signifies no pain and 10 signifies unbearable pain). Assess and document pain at scheduled intervals to determine the degree of pain control, to observe for drug side effects, and to assess the need for changes in the dosage and/or frequency of medication administration. When a range of dosage is ordered, carefully titrate opioid dosages based on individual assessments of need and response to therapy.

Using NANDA, NIC, and NOC

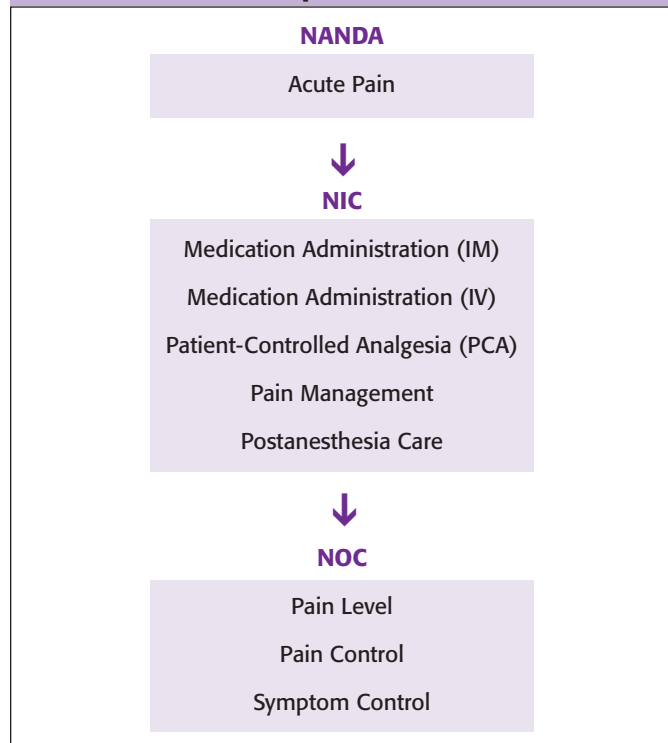
Chart 4–1 shows links between NANDA nursing diagnoses, NIC, and NOC when caring for the postoperative client.

Community-Based Care

Because the postoperative phase does not end until the client has recovered completely from the surgical intervention, the nurse plays a vital role as the client nears discharge. As the client prepares to recuperate at home, provide information and support to help the client successfully meet self-care demands. All aspects of teaching should be accompanied by written guidelines, directions, and information. This is particularly helpful when a large amount of unfamiliar, detailed information is presented. Because the hospital stay is often brief, make an organized, coordinated effort to educate the client and family. Teaching needs vary, but the most common needs include:

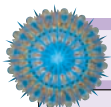
- How to perform wound care. Teaching is more effective if the nurse first demonstrates and explains the procedure for the client and family or other caregiver. The client and family should then participate in the care. To evaluate the effectiveness of the teaching, ask the client or caregiver to demonstrate the procedure in return. Ideally, teaching is carried out over several days, evaluated, and periodically reinforced.

NANDA, NIC, AND NOC LINKAGES CHART 4–1 The Postoperative Client



Data from *NANDA's Nursing Diagnoses: Definitions & Classification 2005–2006* by NANDA International (2003), Philadelphia; *Nursing Interventions Classification (NIC)* (4th ed.) by J. M. Dochlerman & G. M. Bulechek (2004), St. Louis, MO: Mosby; and *Nursing Outcomes Classification (NOC)* (3rd ed.) by S. Moorhead, M. Johnson, and M. Maas (2004), St. Louis, MO: Mosby.

- Signs and symptoms of a wound infection. The client should be able to determine what is normal and what should be reported to the physician.
- Method and the frequency of taking one's temperature.
- Limitations or restrictions that may be imposed on such activities as lifting, driving, bathing, sexual activity, and other physical activities.
- Control of pain. If analgesics are prescribed, instruct the client in the dosage, frequency, purpose, common side effects, and other side effects to report to the physician. Reinforce the use of relaxation, distraction, imagery, or other pain control techniques that the client has found useful in controlling postoperative pain.

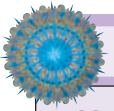


NURSING CARE PLAN A Client Having Surgery

Martha Overbeck is a 74-year-old widow of German descent who lives alone in a senior citizens' housing complex. She is active there, as well as in the Lutheran Church. She has been in good health and is independent, but she has become progressively less active as a result of arthritic pain and stiffness. Mrs. Overbeck has degenerative joint changes that have particularly affected her right hip. On the recommendation of her physician and following a dis-

cussion with her friends, Mrs. Overbeck has been admitted to the hospital for an elective right total hip replacement. Her surgery has been scheduled for 8:00 A.M. the following day.

Mrs. Eva Jackson, a close friend and neighbor, accompanies Mrs. Overbeck to the hospital. Mrs. Overbeck explains that her friend will help in her home and assist her with the wound care and prescribed exercises.



NURSING CARE PLAN A Client Having Surgery (continued)

ASSESSMENT

Gloria Nobis, RN, is assigned to Mrs. Overbeck's care on return to her room. Ms. Nobis performs a complete head-to-toe assessment and determines that Mrs. Overbeck is drowsy but oriented. Her skin is pale and slightly cool. Mrs. Overbeck states she is cold and requests additional covers. Ms. Nobis places a warmed cotton blanket next to Mrs. Overbeck's body, adds another blanket to her covers, and adjusts the room's thermostat to increase the room temperature. Mrs. Overbeck states that she is in no pain and would like to sleep. She has even, unlabored respirations and stable vital signs as compared to preoperative readings.

Mrs. Overbeck is NPO. An intravenous solution of dextrose and water is infusing at 100 mL/h per infusion pump. No redness or edema is noted at the infusion site. Ms. Nobis notes that the antibiotic ciprofloxacin hydrochloride (Cipro) is to be administered by mouth when the client is able to tolerate fluids. Mrs. Overbeck has a large gauze dressing over her right upper lateral thigh and hip with no indications of drainage from the wound. Tubing protrudes from the distal end of the dressing and is attached to a passive suctioning device (Hemovac). Ms. Nobis empties 50 mL of dark red drainage from the suctioning device and records the amount and characteristics on a flow record. Mrs. Overbeck has a Foley catheter in place with 250 mL of clear, light amber urine in the dependent gravity drainage bag.

When assessing Mrs. Overbeck's lower extremities, Ms. Nobis finds her feet slightly cool and pale with rapid capillary refill time bilaterally. Dorsalis pedis and posterior tibial pulses are strong and equal bilaterally. Ms. Nobis notes slight pitting edema in the right foot and ankle as compared with the left extremity. She also notes sensation and ability to move both feet and toes, without numbness or tingling (paresthesia).

Ms. Nobis records the above findings on a postoperative flow-sheet. After ensuring that Mrs. Overbeck is safely positioned and can reach her call light, Ms. Nobis gives Mrs. Overbeck's friend, Mrs. Jackson, a progress report. They then go into Mrs. Overbeck's room.

DIAGNOSES

Ms. Nobis makes the following postoperative nursing diagnoses for Mrs. Overbeck.

- *Risk for Infection* of right hip wound related to disruption of normal skin integrity by the surgical incision
- *Risk for Injury* related to potential dislocation of right hip prosthesis secondary to total hip replacement
- *Pain* related to right hip incision and positioning of arthritic joints during surgery

EXPECTED OUTCOMES

The expected outcomes established in the plan of care specify that Mrs. Overbeck will:

- Regain skin integrity of the right hip incision without experiencing signs or symptoms of infection.
- Demonstrate (along with Mrs. Jackson) proper aseptic technique while performing the dressing change.
- Verbalize signs and symptoms of infection to be reported to her physician.
- Describe measures to be taken to prevent dislocation of right hip prosthesis.

- Report control of pain at incision and in arthritic joints.
- Remain afebrile.

PLANNING AND IMPLEMENTATION

Ms. Nobis develops a care plan that includes the following interventions to assist Mrs. Overbeck during her postoperative recovery.

- Use aseptic technique while changing dressing.
- Monitor temperature and pulse every 4 hours to assess for elevation.
- Assess wound every 8 hours for purulent drainage and odor. Assess edges of wound for approximation, edema, redness, or inflammation in excess of expected inflammatory response.
- Teach Mrs. Overbeck and Mrs. Jackson how to use aseptic technique while assessing the wound and performing the dressing change.
- Teach Mrs. Overbeck and Mrs. Jackson the signs and symptoms of infection and when to report findings to the physician.
- Review and discuss with Mrs. Overbeck the written materials on total hip replacement.
- Convey empathetic understanding of Mrs. Overbeck's incisional and arthritic joint pain.
- Medicate Mrs. Overbeck every 4 hours (or as ordered) to maintain a therapeutic analgesic blood level.

EVALUATION

Throughout Mrs. Overbeck's hospitalization, Ms. Nobis works with Mrs. Overbeck and Mrs. Jackson to ensure that Mrs. Overbeck can care for herself after discharge from the hospital. Five days after her surgery, Mrs. Overbeck is discharged with a well-approximated incision with no indications of an infection. Prior to discharge, Ms. Nobis is confident that with Mrs. Jackson's help, Mrs. Overbeck can properly assess the incision. With minimal help, Mrs. Overbeck is able to replace the dressing using aseptic technique. She can cite the signs and symptoms of an infection, take her own oral temperature, and describe preventive measures to decrease the chances of dislocating her prosthetic hip. Because of her reduced mobility the past 5 days, Mrs. Overbeck says she can tell the arthritis in her "old bones" is "acting up." She reports less pain in her right hip than before the surgery. Mrs. Overbeck tells Ms. Nobis she will be back the following winter to have her left hip replaced.

CRITICAL THINKING IN THE NURSING PROCESS

1. Describe risk factors for Mrs. Overbeck's safety; what changes in her home environment would you suggest to promote safety until she recovers more fully?
2. Why is Mrs. Overbeck placed on the antibiotic Cipro although she has no indications of an infection? What teaching would you do?
3. Mrs. Overbeck's clotting time is slightly elevated as a result of an ordered anticoagulant. Why would this medication be ordered? Consider the client's age and the area of surgery.
4. Mrs. Overbeck is 30 pounds above her ideal weight and has osteoarthritis. Develop a care plan for the nursing diagnosis *Ineffective Health Maintenance* related to intake in excess of metabolic requirements.

See Evaluating Your Response in Appendix C.

EXPLORE MEDIA LINK

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Care Plan Activity: Providing Postoperative Care

Case Study: The Circulating Nurse

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CHAPTER HIGHLIGHTS

- Surgeries take place in traditional and nontraditional settings with increasing use of minimally invasive procedures that expedite discharge, facilitate healing, and increase client satisfaction.
- Surgery is an invasive procedure and legal guidelines must be followed to protect the client and the healthcare providers. The surgical team includes surgeons, anesthetists, nurses, and technicians; all are responsible for the safety of the client and the progression of the surgery.
- The focus on safety during surgery continues to increase with attention directed to preventing wrong site, wrong patient surgeries. Procedures are established to verify that the right patient will have the correct surgery. A team approach to safety works best; each member of the team must feel accountable for the results of the surgery and entitled to share observations and concerns as the procedure progresses.
- Inpatient clients have relatively short stays, which are best achieved by early ambulation, pain control, and proper nutrition. Providing information for self-care is challenging with the shortened stays and rate of admissions and discharges. From the time of entry to the surgical setting, the client's discharge must be planned and prepared.
- Client teaching prior to and following surgery empowers clients to achieve successful recovery, discharge, and rehabilitation. Most of the care clients receive during healing is either provided by self or a caregiver outside the healthcare environment. Clients and their families need to know appropriate assessments and interventions to monitor the healing process.
- Pain management is offered prior to, during, and after surgery with methods designed to give the best therapeutic response. While acute pain occurs related to the surgery, many clients also experience chronic pain that affects their response to pain management therapies.
- Behaviors characteristic of older adult clients and ethnically diverse populations increase the need for individualized care. Assessment of physical and emotional status can be more difficult when clients have hearing or visual impairments or when individuals speak and understand a foreign language. Surgery can be frightening to clients and their families and they need reassurance and interventions to decrease pain, relieve anxiety, and promote healing.
- Operating room and postanesthesia care nursing are professional specialties that require unique orientation and education. These professionals make careful assessments of the risks each client faces and make plans to ensure safe, successful surgical outcomes. Special attention is focused on early recognition and treatment of postoperative complications associated with cardiopulmonary function, respiratory function, wound healing, elimination, and pain.

TEST YOURSELF NCLEX-RN® REVIEW

- 1 The nurse's primary responsibility related to informed consent is:
 1. defining the risks and benefits of the surgery.
 2. witnessing the client's signature on the consent form.
 3. explaining the right to refuse treatment or withdraw consent.
 4. advising the client and family about what is needed for the diagnosis.
- 2 Obtaining a preoperative blood pressure measurement serves the following purpose:
 1. Fulfills a legal requirement.
 2. Informs anesthesiologist so proper level of anesthesia can be given.
 3. Prevents atelectasis.
 4. Provides a baseline to compare postoperative blood pressure levels.
- 3 Nonsteroidal anti-inflammatory drugs are given in the postoperative period to:
 1. stimulate appetite.
 2. increase amnesia.
 3. potentiate analgesia.
 4. improve renal function.
- 4 Discharge planning for a client following general surgery will include dietary management guidelines. Specifically, the client will eat a diet:
 1. low in cholesterol, high in fat.
 2. high in protein, moderate in calories.
 3. low in fat, high in fiber.
 4. diet that is regular, but without dairy products.

- 5** In the immediate postoperative period for knee surgery, assessment distal to the site includes:
1. urinary Ph.
 2. rebound tenderness.
 3. Chvostek's sign.
 4. neurovascular assessment.
- 6** In the postoperative period, medications the client is prescribed prior to surgery must be:
1. continued after surgery.
 2. decreased by half for 36 hours.
 3. ordered anew prior to administration.
 4. withheld until evidence of anesthesia is absent.
- 7** The client with diabetes mellitus who is NPO prior to surgery:
1. has no risk for hyperglycemia.
 2. should receive sliding-scale insulin prescriptions.
 3. will benefit from hypoglycemia during anesthesia.
 4. will fail to manifest signs of hypoglycemia under anesthesia.
- 8** Acute pain management medications in the immediate postoperative period generally
1. progress from NSAIDs to opioids.
 2. progress from oral to parenteral routes.
 3. should be scheduled rather than prn to promote control.
 4. induce a strong sedative effect to decrease the risk of nausea.
- 9** Lengthy operative procedures can put the older client at risk for:
1. memory loss due to blood loss.
 2. hearing loss due to extended anesthesia.
 3. weight loss due to lack of nutritional intake.
 4. pressure sores and joint pain from operative positioning.
- 10** Hypothermia in the perioperative period
1. decreases cardiac ischemia.
 2. reduces the risk for wound infection.
 3. increases client comfort and analgesia.
 4. requires interventions to prevent and relieve.
- See *Test Yourself answers in Appendix C.*

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