

PREOPERATIVE CARE

- Provide routine preoperative care and teaching as outlined in Chapter 7.
- Verify presence of laboratory and diagnostic test results in the chart, including CBC, coagulation profile, urinalysis, chest X-ray, and coronary angiogram. *These baseline data are important for comparison of postoperative results and values.*
- Type and crossmatch four or more units of blood as ordered. *Blood is made available for use during and after surgery as needed.*
- Provide specific client and family teaching related to procedure and postoperative care. Include the following topics.
 - Cardiac recovery unit; sensory stimuli, personnel; noise and alarms; visiting policies
 - Tubes, drains, and general appearance
 - Monitoring equipment, including cardiac and hemodynamic monitoring systems
 - Respiratory support: ventilator, endotracheal tube, suctioning; communication while intubated
 - Incisions and dressings
 - Pain management

Preoperative teaching reduces anxiety and prepares the client and family for the postoperative environment and expected sensations.

POSTOPERATIVE CARE

- Provide routine postoperative care as outlined in Chapter 7. In addition to the care needs of all clients having major surgery, the cardiac surgery client has specific care needs related to open-heart and thoracic surgery. These are outlined under the nursing diagnoses identified below.

Decreased Cardiac Output

Cardiac output may be compromised postoperatively due to bleeding and fluid loss; depression of myocardial function by drugs, hypothermia, and surgical manipulation; dysrhythmias; increased vascular resistance; and a potential complication, *cardiac tamponade*, compression of the heart due to collected blood or fluid in the pericardium

- Monitor vital signs, oxygen saturation, and hemodynamic parameters every 15 minutes. Note trends and report significant changes to the physician. *Initial hypothermia and bradycardia are expected; the heart rate should return to the normal range with rewarming. The blood pressure may fall during rewarming as vasodilation occurs. Hypotension and tachycardia, however, may indicate low cardiac output. Pulmonary artery pressure (PAP), pulmonary artery wedge pressure (PAWP), cardiac output, and oxygen saturation are monitored to evaluate fluid volume, cardiac function, and gas exchange. Hemodynamic monitoring is further discussed in chapter 30.*
- Auscultate heart and breath sounds on admission and at least every 4 hours. *A ventricular gallop, or S_3 , is an early sign of heart failure; an S_4 may indicate decreased ventricular compliance. Muffled heart sounds may be an early indication of cardiac tamponade. Adventitious breath sounds (wheezes, crackles, or rales) may be a manifestation of heart failure or respiratory compromise.*

- Assess skin color and temperature, peripheral pulses, and level of consciousness with vital signs. *Pale, mottled, or cyanotic coloring, cool and clammy skin, and diminished pulse amplitude are indicators of decreased cardiac output.*
- Continuously monitor and document cardiac rhythm. *Dysrhythmias are common, and may interfere with cardiac filling and contractility, decreasing the cardiac output.*
- Measure intake and output hourly. Report urine output less than 30 mL/h for 2 consecutive hours. *Intake and output measurements help evaluate fluid volume status. A fall in urine output may be an early indicator of decreased cardiac output.*
- Record chest tube output hourly. *Chest tube drainage greater than 70 mL/hr or that is warm, red, and free flowing indicates hemorrhage and may necessitate a return to surgery. A sudden drop in chest tube output may indicate impending cardiac tamponade.*
- Monitor hemoglobin, hematocrit, and serum electrolytes. *A drop in hemoglobin and hematocrit may indicate hemorrhage that is not otherwise obvious. Electrolyte imbalances, potassium, calcium, and magnesium in particular, affect cardiac rhythm and contractility.*
- Administer intravenous fluids, fluid boluses, and blood transfusions as ordered. *Fluid and blood replacement helps ensure adequate blood volume and oxygen-carrying capacity.*
- Administer medications as ordered. *Medications ordered in the early postoperative period to maintain the cardiac output include inotropic drugs (e.g., dopamine, dobutamine) to increase the force of myocardial contractions; vasodilators (e.g., nitroprusside or nitroglycerin) to decrease vascular resistance and afterload; and antidysrhythmics to correct dysrhythmias that affect cardiac output.*
- Keep a temporary pacemaker at the bedside; initiate pacing as indicated. *Temporary pacing may be needed to maintain the cardiac output with bradycardias, such as high-level AV blocks.*

PRACTICE ALERT

Assess for signs of cardiac tamponade: increased heart rate, decreased BP, decreased urine output, increased central venous pressure, a sudden decrease in chest tube output, muffled/distant heart sounds, and diminished peripheral pulses. Notify physician immediately. Cardiac tamponade is a life-threatening complication that may develop postoperatively. Cardiac tamponade interferes with ventricular filling and contraction, decreasing cardiac output. Untreated, cardiac tamponade leads to cardiogenic shock and possible cardiac arrest. ■

Hypothermia

Hypothermia is maintained during cardiac surgery to reduce the metabolic rate and protect vital organs from ischemic damage. Although rewarming is instituted on completion of the surgery, the client often remains hypothermic on admission to cardiac recovery. Gradual rewarming is necessary to prevent peripheral vasodilation and hypotension.

- Monitor core body temperature (e.g., tympanic membrane, pulmonary artery, bladder) for the first 8 hours following surgery. *Oral and rectal temperature measurements are not reliable indicators of core body temperature during this period.*
- Institute rewarming measures (e.g., warmed intravenous solutions or blood transfusion, warm blankets, warm inspired gases, radiant heat lamps) as needed to maintain a temperature above 96.8 F (36° C). Administer thorazine, morphine, or diltiazem as ordered to relieve shivering. *Low body temperature may cause shivering, increasing oxygen demand and consumption. Hypothermia also increases the risk for hypoxia, metabolic acidosis, vasoconstriction and increased cardiac work, altered clotting, and dysrhythmias.*

Acute Pain

Following a CABG, pain is experienced due to both the thoracic incision and removal of the saphenous vein from the leg. Dissection of the internal mammary artery (usually the left IMA) from the chest wall also causes chest pain on the affected side. Chest tube sites are also uncomfortable. The leg from which the saphenous vein graft was obtained may be more painful than the chest incision.

- Frequently assess for pain, including its location and character. Document its intensity using a standard pain scale. Assess for verbal and nonverbal indicators of pain. Validate pain cues with the client. *Pain is subjective, and differs among individuals. Incisional pain is expected; however, anginal pain also may develop. It is important to differentiate the type of pain.*

PRACTICE ALERT

Promptly report anginal or cardiac

pain. Cardiac pain may indicate a perioperative or postoperative myocardial infarction. ■

- Administer analgesics on a scheduled basis, by PCA, or by continuous infusion for the first 24 to 48 hours. *Research demonstrates that adequate pain management in the immediate postoperative period reduces complications from sympathetic stimulation and allows faster recovery. Pain causes muscle tension and vasoconstriction, impairing circulation and tissue perfusion, slowing wound healing, and increasing cardiac work.*
- Premedicate 30 minutes before activities or planned procedures. *Premedication and the subsequent reduction of pain improves client participation and cooperation with care.*

Ineffective Airway Clearance/Impaired Gas Exchange

Atelectasis due to impaired ventilation and airway clearance is a common pulmonary complication of cardiac surgery. Gas exchange may also be affected by blood loss and decreased oxygen-carrying capacity following surgery. Phrenic nerve paralysis is a potential complication of cardiac surgery which may also contribute to impaired ventilation and gas exchange.

- Evaluate respiratory rate, depth, effort, symmetry of chest expansion, and breath sounds frequently. *Pain, anxiety, excess fluid volume, surgical injury, narcotics and anesthesia, and altered homeostasis can affect respiratory rate, depth, and effort postoper-*

atively. Decreased chest expansion or asymmetrical movement may indicate impaired ventilation of one lung, and needs further evaluation.

- Note endotracheal tube (ETT) placement on chest X-ray. Mark tube position and secure in place. Insert an oral airway if an oral ETT is used. *The chest X-ray documents correct ETT placement above the bifurcation to the right and left mainstem bronchus. Marking its appropriate placement allows evaluation of potential tube movement. Secure the tube firmly in place to prevent slippage or inadvertent removal. An oral airway helps prevent obstruction of an oral ETT by biting.*
- Maintain ventilator settings as ordered. Monitor arterial blood gases (ABGs) as ordered. *Mechanical ventilation promotes optimal lung expansion and oxygenation postoperatively. ABGs are used to evaluate oxygenation and acid-base balance.*
- Suction as needed. (See Procedure 36-X.) *Suctioning is performed only as indicated to clear airway secretions.*
- Prepare for ventilator weaning and extubation, as appropriate. *The client is removed from the ventilator and extubated as soon as possible to reduce complications associated with mechanical ventilation and intubation.*
- After extubation, teach use of the incentive spirometer, and encourage use every 2 hours. Encourage deep breathing; advise against vigorous coughing. Teach use of a “cough pillow” to splint chest incision and decrease pain. Frequently turn and encourage movement. Dangle on postoperative day 1. *Deep breathing, controlled coughing, and position changes improve ventilation and airway clearance and help prevent complications. Vigorous coughing may excessively increase intrathoracic pressure and cause sternal instability.*

Risk for Infection

Following an open chest procedure, a sternal infection may develop that can progress to involve the mediastinum. Clients with IMA grafts, who are diabetic, are older, or malnourished are at high risk: Harvesting of IMA disrupts blood supply to the sternum, and these clients have impaired immune responses and healing.

- Assess sternal wound every shift. Document redness, warmth, swelling, and/or drainage from the site. *Note wound approximation. These assessments provide indicators of inflammation and healing.*
- Maintain a sterile dressing for the first 48 hours, then leave the incision open to air. Use Steri-Strips as needed to maintain approximation of the wound edges. *The sterile dressing prevents early contamination of the wound, whereas leaving exposing the incision after 48 hours promotes healing.*
- Report signs of wound infection: a swollen, reddened area that is hot and painful to the touch; drainage from the wound; impaired healing, or healed areas that reopen. *Evidence of infection or impaired healing requires further evaluation and treatment.*
- Culture wound drainage as indicated. *Identifying the infective organism facilitates appropriate antibiotic therapy.*
- Collaborate with the dietitian to promote nutrition and fluid intake. *Good nutritional status is vital to healing and immune function.*

continued

Disturbed Thought Processes

Many factors affect neuropsychologic function after CABG, including the length of cardiopulmonary bypass, age, presurgery organic brain dysfunction, severity of illness, and decreased cardiac output. Sensory overload and deprivation, sleep disruption, and numerous drugs also affect thinking and mental clarity.

- Frequently reorient during initial recovery period. State that surgery is over and that the client is in the recovery area. *Frequent reorientation provides emotional support and reality checks.*
- Explain all procedures before performing them. Speak in a clear, calm voice. Encourage questions, and give honest answers. *These measures provide information, decrease anxiety, and establish trust.*
- Secure all intravenous lines and invasive catheters/tubes (e.g., ETT, Foley catheter, nasogastric tube). *Disoriented clients may tug or pull at invasive equipment, disrupting them and increasing the risk of injury.*
- Note verbal responses to questions. Correct misconceptions immediately (e.g., “Mr. Snow, look at all the special equip-

ment in this room. Does this room look like your bedroom at home?”). *Helping the client recognize differences in the hospital environment offers a basis for continual reality checks.*

- Maintain a calendar and clock within the client’s view. *This provides current information regarding day, date, and time.*
- Involve family members in providing reorientation. Place familiar objects and photographs within view. Encourage family presence. *The family provides reassurance and contact with the familiar, assisting with orientation.*
- Promote client participation in care and decision making as appropriate. *This allows the client to maintain a degree of power and control and enables the client to take an active role in recovery.*
- Report signs of hallucinations, delusions, depression, or agitation. *These may indicate progressive deterioration of mental status.*
- Administer sedatives cautiously. *Mild sedation may help prevent injury. Some sedatives may, however, have adverse effects, increasing confusion and disorientation.*
- Reevaluate neurologic status every shift. *These data allow evaluation of the effect of interventions.*