

## **Cancer Nursing Care**

Cancer is a disease process that begins when an abnormal cell is transformed by the genetic mutation of the cellular DNA.

### **PATHOPHYSIOLOGY**

- The abnormal cell forms a clone and begins to proliferate abnormally, ignoring growth-regulating signals in the environment surrounding the cell. Cancer is the second leading cause of death in the United States and occurs more frequently in industrialized areas, with most cancers occurring in men and in people older than 65 years.
- Carcinogenesis is the process by which cancer arises. Categories of agents or factors implicated in carcinogenesis include viruses and bacteria, physical agents, chemical agents, genetic or familial factors, dietary factors, and hormonal agents. Patients who are immunocompetent are also at risk for cancers.
- Cancer cells, or malignant neoplasms, grow in patterns that follow no physiologic demand, acquiring invasive characteristics. Cells infiltrate body tissues, lymph, and blood vessels, which carry the cells to other areas of the body; this is called metastasis. Initially, malignant cells in a tumor look alike; over time, the differences increase, with ongoing random mutations during tumor progression. Cancerous cells are classified and named by tissue of origin.

### **RISK FACTORS**

- Primary prevention includes avoiding known carcinogens, maintaining a normal weight, and consuming a prudent diet, low in fat and including cruciferous vegetables such as broccoli.
- Secondary prevention focuses on early detection and screenings that focus on the highest detection rates such as mammography, digital rectal exam for prostate cancer screening, and colonoscopy.

### **CLINICAL MANIFESTATIONS AND ASSESSMENT**

- Manifestations are related to the system affected and to tissue destruction with replacement by nonfunctional cancer tissue or over productive cancer tissue (e.g., bone marrow disruption, pressure on surrounding structures, increased metabolic demands, and disruption of production of blood cells). (See the specific type of cancer.)
- Generally, cancer symptoms are related to the area affected and may cause anemia, weakness, anorexia weight loss, and pain, often in late stages.

### **DIAGNOSTIC METHODS**

A complete history and physical examination are performed. Knowledge of suspicious symptoms and of the behavior of particular types of cancer assists in determining which diagnostic tests are most appropriate. Patients with suspected cancer undergo extensive testing to:

- Determine the presence and extent of tumor
- Identify possible spread (metastasis) of disease or invasion of other body tissues
- Evaluate the function of involved and uninvolved body systems and organs
- Obtain tissue and cells for analysis, including evaluation of tumor stage and grade.

Diagnostic tests may include tumor marker identification, genetic profiling, imaging studies (mammography, magnetic resonance imaging [MRI], computed tomography [CT], fluoroscopy, ultrasonography, endoscopy, nuclear medicine imaging, positron emission tomography [PET], PET fusion, radioimmunoconjugates), and biopsy.

#### **Tumor Staging and Grading**

- Staging determines the size of the tumor and the extent of disease and is used to plan treatment and determine prognosis. Several systems exist for classifying the disease stage. The TNM system is frequently used for many solid tumor types. In this system, “T” refers to the extent of the primary tumor, “N” refers to lymph node involvement, and “M” refers to the extent of metastasis.
- Grading refers to the classification of the tumor and the degree to which the tumor cells retain the functional and histologic characteristics of the tissue of origin. A scale of I to IV is used; grade I tumors most closely resemble the cells of origin and respond well to treatment, whereas grade IV

tumors are poorly differentiated (dissimilar) and tend to be aggressive and less responsive to treatment.

### **Gerontologic Considerations**

Due to an increased life expectancy and the increased risk of cancer with age, cancer-related care involves a growing number of elderly patients. More than 58% of all cancers occur in people older than 65 years of age, and about two-thirds of all cancer deaths occur in people 65 years of age and older. Concerns in the elderly include:

- Chemotherapy-related toxicities, such as renal impairment, myelosuppression, fatigue, and cardiomyopathy, which may increase as a result of declining organ function and diminished physiologic reserves
- Delayed recovery of normal tissues after radiation therapy and more severe adverse effects, such as mucositis, nausea and vomiting, and myelosuppression
- Slower recovery from surgery due to decreased tissue healing capacity and declining pulmonary and cardiovascular functioning
- Higher risk for complications such as atelectasis, pneumonia, and wound infections

### **MEDICAL AND NURSING MANAGEMENT**

Treatment goals may include complete eradication of malignant disease (cure), prolonged survival and containment of cancer cell growth (control), or relief of symptoms associated with the disease (palliation).

#### **Surgical Management**

- Surgery may be the primary method of treatment, or it may be prophylactic, palliative, or reconstructive. Diagnostic surgery is the definitive method of identifying the cellular characteristics that influence all treatment decisions.
- A biopsy is performed to obtain a tissue sample for analysis of cells suspected to be malignant.

#### **Surgery as Primary Treatment**

When surgery is the primary approach in treating cancer, the goal is to remove the entire tumor or as much as is feasible. Local excision refers to removing the tumor and a small margin of tissue surrounding it; wide excision refers to removing the tumor and any surrounding tissue that is involved or may be at high risk for tumor spread, including regional lymph nodes. Disfigurement or altered function may result; however, this method is considered when the chance of cure and control are good.

#### **Prophylactic Surgery**

Prophylactic surgery involves removing nonvital tissues or organs that are likely to develop cancer. Recent ability to identify genetic markers and predispositions to certain cancers contribute to decisions to undergo prophylactic surgery. Mastectomy and colostomy are examples of surgeries.

#### **Palliative Surgery**

When cure is not possible, the goals of treatment are to make the patient as comfortable as possible and to improve quality of life as defined by the patient. Palliative surgery is performed in an attempt to relieve complications of cancer, such as ulcerations, obstructions, hemorrhage, pain, and malignant effusions.

#### **Nursing Management in Cancer Surgery**

The nurse's role in caring for the patient undergoing cancer surgery is much like caring for all surgical candidates. In addition to focusing on the typical effects of surgery, caring for patients with cancer include:

- Addressing effects of surgery on body image, self-esteem, and functional abilities
- Observing for complications related to radiation and chemotherapy in addition to surgery, which may cause infection, impaired wound healing, or altered pulmonary or renal function

- Focus on prevention of venous thromboembolism (VTE) or deep vein thrombosis (DVT), which is more common in cancer due to an increase in circulating procoagulants

### **Radiation Therapy**

Radiation is delivered to tumor sites by external or internal means.

- External radiation uses a machine to deliver X-rays to the affected area.
- Internal radiation implantation, or brachytherapy, delivers a high dose of radiation to a localized, internal area using radioactive needles, seeds, beads, or catheters inserted into body cavities (e.g., vagina, abdomen, pleura) or interstitial compartments (e.g., breast).
- Brachytherapy may also be administered orally, as with the isotope iodine-131, which is used to treat thyroid carcinomas

### **Intracavitary Radiation**

Intracavitary radioisotopes are frequently used to treat gynecologic cancers. The radioisotopes are inserted into applicators positioned in the cervix and vagina, and the position is verified by X-ray. These radioisotopes remain in place for a prescribed time period and then are removed. The patient is maintained on bed rest and log-rolled to prevent displacement.

### **Safety**

Patients receiving internal radiation emit radiation while the implant is in place. Contact with the health care team is guided by principles of time, distance, and shielding to minimize exposure of personnel to radiation.

### **NURSING ALERT**

For safety in brachytherapy, assign the patient to a private room and post appropriate notices about radiation safety precautions. Pregnant staff members should not be assigned to this patient. Staff members wear dosimeter badges. Children or pregnant women should not visit, and others should visit only 30 minutes daily. Instruct and monitor visitors to ensure they maintain a 6-foot distance from the radiation source.

### **Toxicity**

- Toxicity is related to the area receiving radiation; symptoms may be increased if chemotherapy is concomitantly administered.
- Local reactions such as altered skin integrity, alopecia (hair loss), erythema, and shedding of skin (desquamation) may occur. Reepithelialization occurs after treatments have been completed.
- Alterations in oral mucosa secondary to radiation therapy include stomatitis, xerostomia (dryness of the mouth), change and loss of taste, and decreased salivation.
- The entire gastrointestinal (GI) mucosa may be involved, and esophageal irritation with chest pain and dysphagia may result. Anorexia, nausea, vomiting, and diarrhea may occur if the stomach or colon is in the irradiated field. Symptoms subside and GI reepithelialization occurs after treatments have been completed.
- If sites containing bone marrow (e.g., the iliac crest, sternum) are included in the radiation field, anemia, leukopenia (decreased white blood cells [WBCs]), and thrombocytopenia (a decrease in platelets) may result, putting the patient at increased risk for infection and bleeding. Chronic anemia may occur due to the cumulative effects of radiation, causing shortness of breath, dizziness, fatigue, decreased oxygen saturation, and decreased activity tolerance.
- Systemic side effects, secondary to substances released due to tumor destruction, include fatigue, malaise, and anorexia.

### **Chemotherapy**

Chemotherapy uses antineoplastic agents to destroy tumor cells by interfering with cellular functions, including replication. Chemotherapy is used primarily to treat systemic disease rather than localized lesions that are amenable to surgery or radiation. Chemotherapy may be combined with surgery, radiation therapy, or both, to reduce tumor size preoperatively (neoadjuvant), to destroy any remaining

tumor cells postoperatively (adjuvant), or to treat hematologic malignancies such as lymphoma and leukemia. The goals of chemotherapy (cure, control, palliation) define the medications to be used and the aggressiveness of the treatment plan.

- Chemotherapy kills rapidly dividing cells.
- Each cycle of chemotherapy kills a certain percentage of tumor cells. The goal of treatment is eradication of enough of the tumor so that the remaining tumor cells can be destroyed by the body's immune system.
- Chemotherapy drugs are often given in combinations, referred to as a protocol or regimen. Combination chemotherapy overcomes drug resistance and uses the synergistic effects of some drugs while minimizing toxicity of others.
- Chemotherapy is administered in the hospital, clinic, or home setting by a variety of routes including topical, oral, IV, intramuscular, subcutaneous, arterial, intracavitary, and intrathecal. Intrathecal chemotherapy is the administration of medication into the cerebrospinal fluid to prevent central nervous system (CNS) metastasis. This can be accomplished through a lumbar puncture or through the placement ventricle of the brain.

### **Classification of Chemotherapy**

- Chemotherapy can be classed as cell cycle-specific or -nonspecific. Cell cycle-specific drugs destroy cancer cells in a certain phase of the cell cycle (ie, S phase). Cell cycle-nonspecific drugs act independently of the cell cycle and may have a prolonged effect on cells.
- Classification of chemotherapeutic agents include alkylating agents, nitrosoureas, antimetabolites, antitumor antibiotics, plant alkaloids, hormonal agents, and those that are miscellaneous.
- Dosage of antineoplastic agents is based on the patient's total body surface area and weight, previous response to chemotherapy or radiation therapy, function of major organ systems, and performance status.
- Central venous access devices may be recommended for frequent or prolonged treatment.

### **\*! NURSING ALERT**

Because of the high potential for error with chemotherapy dosing, the standard expectation is that two nurses verify the chemotherapy dose for accuracy.

### **\*! NURSING ALERT**

- Carefully assess the patient for infusion-related events such as hypersensitivity and extravasation.
- Common symptoms of hypersensitivity reactions include anxiety, flushing, rash, bronchospasm, and hemodynamic collapse. Be prepared to stop the infusion, maintain airway patency, and administer O<sub>2</sub> and emergency medications such as epinephrine.
- Vesicants are agents that, if extravasated into the subcutaneous tissue, cause tissue ulceration and necrosis, and may damage underlying tendons, nerves, and blood vessels. Stop infusion immediately and obtain an order for neutralizing agents. If frequent, prolonged administration of antineoplastic vesicants is anticipated, central venous access devices may be inserted.

### **\*! NURSING ALERT**

If extravasation is expected, stop the infusion immediately, aspirate any residual medication, obtain orders for a neutralizing solution or antidote, apply ice per policy, and notify the provider. Treatment of extravasation varies based on the individual medication.

### **Chemotherapy Toxicity**

Cells with rapid growth rates (eg, epithelium, bone marrow, hair follicles, sperm) are most susceptible to the effects of chemotherapy.

- GI system: Nausea, vomiting, anticipatory vomiting
- Hematologic system: Anemia, thrombocytopenia, leukopenia

- Reproductive system: Abnormal ovulation, early menopause, azoospermia (absence of spermatozoa) or permanent sterility may develop. Chromosomal abnormalities in offspring may occur. Banking of sperm is recommended for men before treatments are initiated.
- As chemotherapy kills rapidly dividing cells and may damage the fetus, reliable methods of birth control must be used.

### **Bone Marrow Transplantation (BMT)**

#### **Hematopoietic Stem Cell Transplantation (HSCT)**

- Bone marrow or stem cells from the patient (autologous) or from a donor (allogeneic) allow the bone marrow to be “rescued” from the toxic effects of the chemotherapy.
- Allogenic cells come from a related donor (family member), a matched unrelated donor (national bone marrow registry/cord blood registry), or are syngeneic (from an identical twin).
- Donor cells can be obtained by harvesting large amounts of bone marrow tissue under general anesthesia or, peripheral blood stem cell transplantation using apheresis may be used.
- The donor’s healthy immune system is able to recognize the patient’s malignancy as foreign and destroys tumor cells (graft vs. tumor effect).
- The infused cells travel to the bone marrow, where the cells mature and proliferate, producing RBCs, WBCs, and platelets (2 to 4 weeks). Chemotherapy or radiation may be administered before the transplant to prevent destruction of the transplanted, foreign cells.
- Patients are at high risk for infection, sepsis, and bleeding. Side effects of high-dose chemotherapy and total body irradiation include alopecia, hemorrhagic cystitis, nausea, vomiting, diarrhea, and severe stomatitis. Chronic side effects include sterility, pulmonary dysfunction, cardiac dysfunction, and liver disease.
- Graft versus host disease (GVHD) occurs in allogeneic transplant when transplanted T lymphocytes view the recipient’s tissue as “foreign” and mount an immune response against it. GVHD may be acute or chronic.

#### **Nursing Care for HSCT**

- Monitor vital signs and blood oxygen saturation.
- Assess for adverse effects, such as fever, chills, shortness of breath, chest pain, cutaneous reactions (hives), nausea, vomiting, hypotension or hypertension, tachycardia, anxiety, and taste changes.
- Maintain strict aseptic technique; until engraftment of the new marrow occurs, the patient is at high risk for death from sepsis and bleeding.
- Administer blood products, hematopoietic growth factors, and antibiotics, while observing for side effects including nephrotoxicity from chemotherapy and antibiotics.
- Monitor for GVHD. Effects on the skin, liver, and GI tract include red maculopapular rash commonly found on the palms of the hands and soles of the feet, elevated liver function tests (LFTs), weight gain, jaundice, right upper quadrant pain, diffuse abdominal pain, early satiety, and diarrhea.
- Provide ongoing support and patient teaching.

#### **Targeted Therapies**

The mechanisms of action of targeted therapies include stimulation or augmentation of immune responses through the use of biologic response modifiers (BRMs), targeting of cancer cell growth factors and proteins, promotion of apoptosis (programmed cell death), and genetic manipulation through gene therapy.

#### **Nursing Management for Targeted Therapies**

- Observe for flu-like symptoms such as fever, chills, myalgia, nausea, hypotension, and pulmonary edema.
- Teach patient and family subcutaneous injection technique for self-administration, when appropriate.

#### **Nursing Management for the Patient with Cancer**

Patients with cancer may have signs and symptoms of varying severity depending on the site of the cancer, stage, and treatments. Goals for the patient may include:

- Management of stomatitis
- Maintenance of tissue integrity
- Maintenance of nutrition
- Relief of pain and fatigue
- Improved body image
- Progression through the grieving process
- Absence of complications

### **Nursing Interventions**

- Minimize fatigue with anticipatory guidance that fatigue may accompany treatment; alternate periods of rest and planned activity/exercise. Continue with enjoyable activities. Manage pain, dyspnea, constipation, and fear/anxiety.
- Maintain nutrition and caloric intake encouraging small frequent meals. Monitor H&H and administer Erythropoiesis stimulating agents (ESAs) for anemia

### **Prevent and Treat Sepsis**

- Monitor the WBCs for leukopenia and the differential for neutropenia (a decrease in the number of neutrophils) and the absolute neutrophil count (ANC). The lowest point or nadir of the WBCs occurs 7 to 10 days after the patient receives chemotherapy.
- Monitor the temperature and central venous access device sites to detect early signs of infection.
- Obtain cultures of blood, sputum, urine, stool, catheters, and wounds if a fever of 38 ° C (100.4 ° F) develops. Collaborate with the physician to obtain orders for antibiotic therapy.
- Teach patients and families proper hand hygiene, signs and symptoms of infection.
- Administer hematopoietic growth factors when indicated.

### **Monitor and Manage Bleeding and Hemorrhage**

- Monitor for thrombocytopenia; platelet counts between 20,000 and 50, 000 are associated with increased risk for bleeding; less than 20,000 is associated with spontaneous bleeding. Transfuse platelets prior to invasive procedures and as ordered.
- Avoid ASA, NSAIDs, warfarin, heparins.
- Observe for bleeding, bruising, petechiae, hematuria, epistaxis, hemoptysis, blood in the stools, oozing at injection sites. Have the patient use a soft toothbrush or sponge, and electric razor. Avoid unnecessary invasive procedures (e.g., rectal temperatures, intramuscular injections, catheterization), and remove environmental hazards that may lead to falls or other trauma. Soft foods, increased fluid intake, and stool softeners may be indicated to reduce trauma to the GI tract. The joints and extremities are handled and moved gently to minimize the risk of spontaneous bleeding. Following venipuncture, pressure must be applied for 3 to 5 minutes.

### **Manage Stomatitis**

Observe for inflammation, redness, or edema of the oral cavity. Encourage good oral hygiene, including brushing with a soft-bristled toothbrush or swab, flossing, and rinsing with saline or tap water.

### **Manage Nausea and Vomiting**

- Nausea is subjective. Assess precipitating and alleviating factors, and previous experiences with nausea. Physical assessment should include signs of associated symptoms including sweating, tachycardia, dizziness, pallor, excessive salivation, weakness, gastric distention, abdominal tenderness, and evaluation of bowel sounds.
- Monitor laboratory values, including electrolytes and renal function.

- Administer serotonin receptor antagonists, such as ondansetron, around the clock with breakthrough doses if needed, also corticosteroids, anti-anxiety medications. Consider nonpharmacologic interventions.

### **Maintain and Manage Alterations in Skin Integrity**

- Observe for site-specific tissue reactions to cancer, surgery, chemotherapy, and radiation.
- Apply sulfadiazine cream for moist desquamation (painful, red, moist skin).
- Manage malignant skin lesions by reducing bacteria, controlling bleeding, preventing trauma, and relieving pain.
- Assist in coping with alopecia; the extent of alopecia depends on the extent and duration of radiation or chemotherapy. Hair loss usually begins 2 to 3 weeks after initiation of the therapy and begins to regrow within 8 weeks after the last treatment; radiation to the head may lead to permanent hair loss. Encourage the patient to obtain a wig before the hair falls out, and to use scarves or hats. Support the patient through the hair loss, which can interfere with coping, interpersonal relationships, and sexuality.

### **Improve Nutritional Status**

- Monitor weight, anorexia, nausea, vomiting. Observe for cachexia (muscle wasting). Monitor diagnostic tests, serum protein, iron, electrolytes, lymphocytes, H & H.
- Anorexia typically results from altered taste, which may result from zinc or mineral deficiencies. Feelings of fullness develop. An aversion to food may develop secondary to nausea and vomiting.
- Teach the patient to avoid unpleasant smells, consider patient preference, consume larger amounts of food earlier in the day, and avoid fluids with meals.
- Provide oral hygiene prior to meals.
- Corticosteroids or progestational medications (ie, megestrol) may be used as appetite stimulants. Metoclopramide may promote gastric emptying.
- TPN, enteral nutrition, or vitamin replacement may be needed.

### **Relieve Pain**

- Pain may be secondary to the tumor, diagnostic tests, or the treatment.
- Assess pain including physical and psychosocial influences. A comprehensive pain assessment is completed, including onset, duration, location, quality or characteristics, quantity, aggravating and alleviating factors, associated symptoms, and those treatments that the patient has used to relieve pain.
- Assess for factors that increase the perception of pain, such as fear and apprehension, fatigue, anger, and social isolation. Encourage adequate sleep and rest, empathy.
- Administer analgesics with additional medication for breakthrough pain and adjuvants, such as antidepressants and anti-anxiety medications.
- Help improve body image by assisting patient to retain control and positive self-esteem. Encourage independence, and discuss negative feelings related to body image and sexuality.

### **Evaluation**

- Maintains integrity of oral mucous membranes
- Maintains adequate tissue integrity
- Maintains adequate nutritional status
- Achieves relief of pain and discomfort
- Demonstrates increased activity tolerance and decreased fatigue
- Exhibits improved body image and self-esteem
- Demonstrates positive progression through the grieving process
- Experiences no complications, such as infection, or sepsis, and no episodes of bleeding or hemorrhage

## **END-OF-LIFE CONSIDERATIONS**

- When cure or control of the disease is no longer possible, use a comprehensive multidisciplinary program that focuses on quality of life, palliation of symptoms, and provision of psychosocial and spiritual support for patients and families.
- Hospice care may be provided in the hospital or at home, with the nurse coordinating physicians, social workers, clergy, dietitians, pharmacists, physical therapists' activities.
- The nurse helps patients and families with grief and loss, as well as providing bereavement counseling and family support for survivors.