



Wolters Kluwer

When you have to be right

Introduction to Clinical Pharmacology

Chapter 50 Traditional Chemotherapy

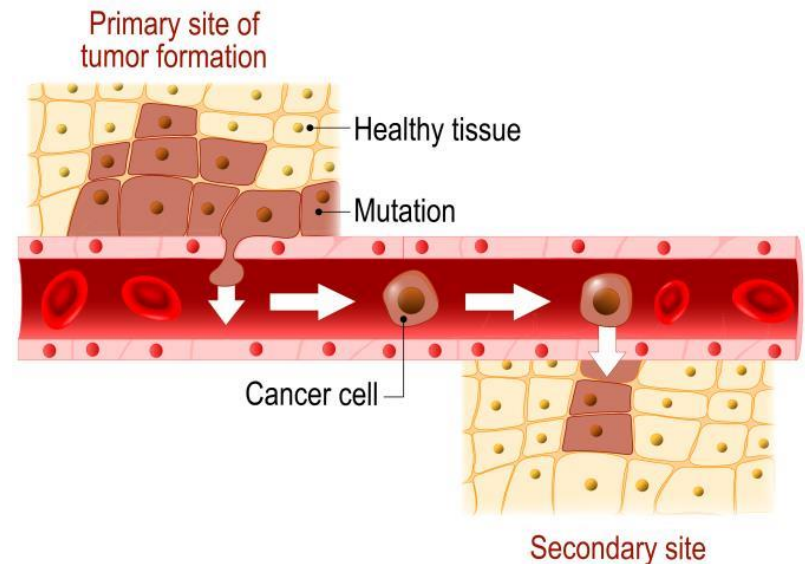
Learning Objectives

1. List the types of drugs used in the treatment of neoplastic diseases.
2. Explain the uses, general drug actions, general adverse reactions, contraindications, precautions, and interactions of the traditional chemotherapy drugs.
3. Distinguish important preadministration and ongoing assessment activities the nurse should perform with the client taking traditional chemotherapy drugs.
4. List nursing diagnoses particular to a client taking traditional chemotherapy drugs.
5. Examine ways to promote an optimal response to therapy, how to manage common adverse reactions, and important points to keep in mind when educating clients about the use of a traditional chemotherapy drug.

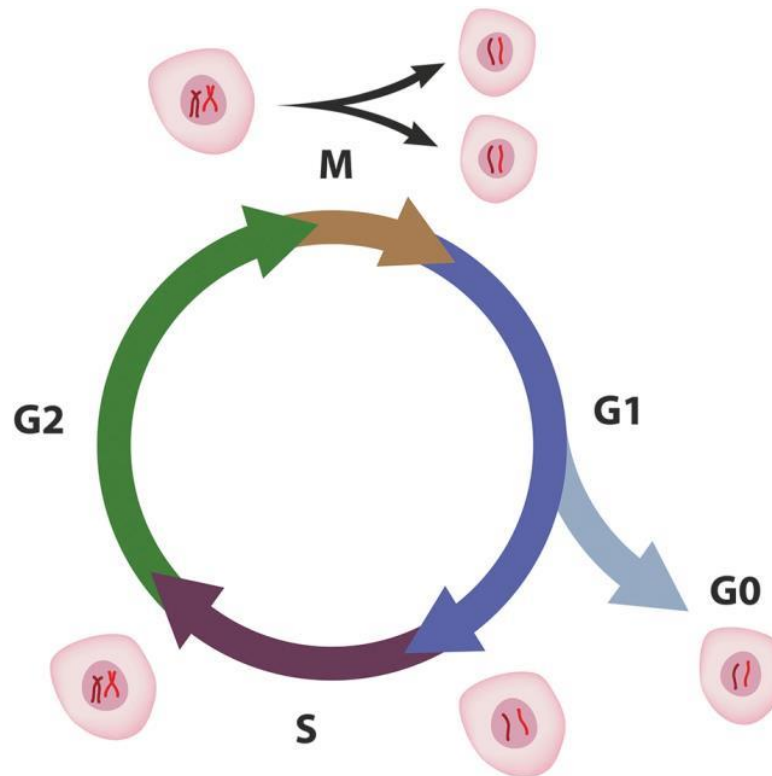
Chemotherapy, Metastasis, and Palliation

- Chemotherapy: drugs used to treat cancer
- Metastasis: spreading of cancer to other sites
- Palliation: comfort care, the relief of symptoms at end of life

METASTASIS



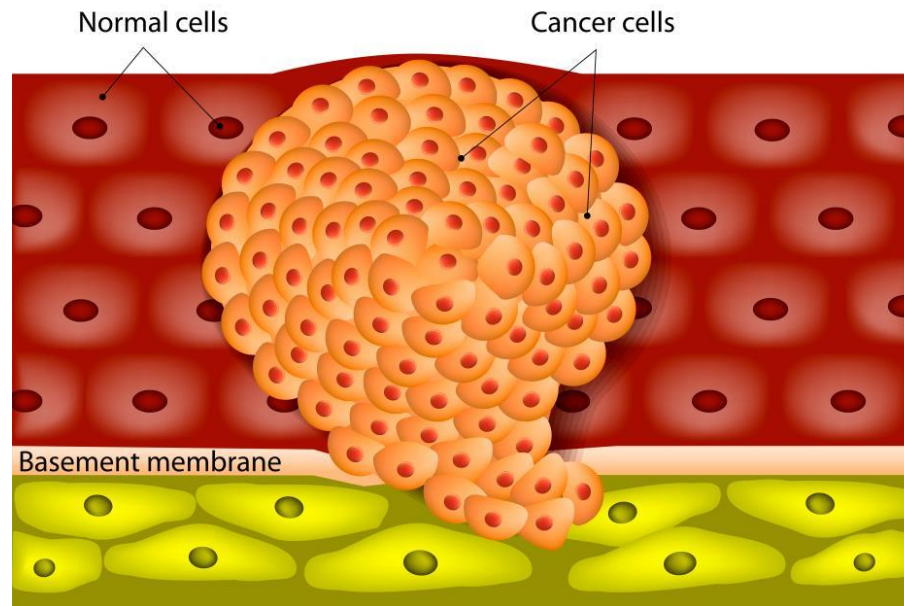
The Cell Cycle



Malignant Neoplasms

- Malignant Neoplasms: cancerous tumors that consist of rapidly growing abnormal cells

GROWING MALIGNANT TUMOR



Traditional Chemotherapy Categories

- Cell cycle specific
- Cell cycle nonspecific



Pharmacology in Practice Exercise #1

A nurse is caring for a client who is prescribed vinblastine. The nurse explains to the client that vinblastine is a cell-cycle-specific drug. Which of the following is a characteristic of a cell cycle-specific drug?

- a) Targets the cells at any phase of the cycle
- b) Targets only the cells that are malignant
- c) Targets the cells in various states of cell division
- d) Targets the cells in one of the phases of cell division



Cell Cycle-Specific Drugs: Actions and Uses #1

- Plant alkaloids:
 - Vinca alkaloids: interfere with amino acid production in S phase and formation of microtubules in M phase
 - Taxanes: interfere in M phase with microtubules
 - Podophyllotoxins: cells are unable to divide since cells are stopped during S and G2 phases by the podophyllotoxins
 - Camptothecin analogue drugs: DNA synthesis during the S phase is inhibited by camptothecin analogue drugs such as topotecan (Hycamtin).

Cell Cycle-Specific Drugs: Actions and Uses #2

- Antimetabolites:
 - Incorporate themselves into the cellular components during the S phase of cell division to interfere with synthesis of RNA and DNA, make it impossible for cancerous cell to divide into two daughter cells
 - Used to treat: leukemia, lymphoma, solid tumors, autoimmune diseases

Cell Cycle-Nonspecific Drugs: Actions and Uses

- Alkylating agents:
 - Change cell to more alkaline environment, which in turn damages the cell
- Antineoplastic antibiotics:
 - Interfere with DNA and RNA synthesis, delaying or inhibiting cell division
- Miscellaneous antineoplastic drugs:
 - A number of drugs are used for antineoplastic actions, do not belong to any one category

Traditional Chemotherapy—Adverse Reactions #1

- Immediate Adverse Reactions:
 - Nausea and vomiting from highly emetic drugs or potential of IV extravasation of irritating solutions
- Some reactions are dose-dependent



Traditional Chemotherapy—Adverse Reactions #2

- Common Adverse Reactions:
 - Bone marrow suppression, stomatitis, diarrhea, hair loss
 - Leukopenia and thrombocytopenia may cause cycles of chemotherapy to be delayed until blood cell counts can be raised
 - Damage gonads and other organ systems



Pharmacology in Practice Exercise #2

The purpose of antineoplastic drugs is to affect cells that rapidly divide and reproduce. However, the adverse effects produced by traditional chemotherapy drugs are the result of their systematic use which exposes malignant cells in the body that are rapidly dividing and reproducing. Which of the following is not an example of a rapidly dividing and reproducing cell in the body?

- a) Nerve cell
- b) Bone marrow
- c) Hair follicle
- d) Oral mucosal cell



Traditional Chemotherapy—Contraindications and Precautions

- Contraindicated in clients:
 - With leukopenia, thrombocytopenia, anemia, serious infections, renal disease, and hypersensitivity to drug; during pregnancy or lactation
- Used cautiously in:
 - Clients with renal or hepatic impairment, active infection, and debilitating illnesses; those who have completed treatment with other traditional chemotherapy drugs or radiation therapy



Traditional Chemotherapy—Interactions #1

Interacting Drug	Common Use	Effect of Interaction
Plant Alkaloids		
Digoxin	Cardiac problems	Decrease serum level of digoxin
Phenytoin	Seizure disorders	Increase risk of seizures
Oral anticoagulants	Prevent blood clots	Prolonged bleeding

Traditional Chemotherapy—Interactions #2

Interacting Drug	Common Use	Effect of Interaction
Antimetabolites		
Digoxin	Cardiac problems	Decrease serum level of digoxin
Phenytoin	Seizure disorders	Decreased need for antiseizure medication
NSAIDs	Pain relief	Methotrexate toxicity

Traditional Chemotherapy—Interactions #3

Interacting Drug	Common Use	Effect of Interaction
Alkylating Drugs		
Aminoglycosides	Anti-infective agents	Increased risk of nephrotoxicity and ototoxicity
Loop diuretics	Heart problems and edema	Increased risk of ototoxicity
Phenytoin	Seizure disorder	Increased risk of seizure
Antineoplastic Antibiotics		
Digoxin	Cardiac problems	Decrease serum level of digoxin

Traditional Chemotherapy—Interactions #4

Interacting Drug	Common Use	Effect of Interaction
Miscellaneous Antineoplastic Drugs		
Insulin and oral antidiabetics	Diabetes management	Increased risk of hyperglycemia
Oral anticoagulants	Prevent blood clots	Prolonged bleeding
Antidepressants, antihistamines, opiates, or sedatives	Depression, allergy, pain relief, or sedation respectively	Increased risk of central nervous system depression

Nursing Process—Client Receiving a Traditional Chemotherapy Drug #1

Preadministration Assessment

Depends on type of cancer and the client's physical condition

- **Objective Data**
 - Note the type and location of neoplastic lesion
 - Stage of the disease: early, metastatic, or terminal
 - Vital signs
 - General appearance: skin color, temperature, pain, differences bilaterally
 - Lab tests: to identify cancer or measure whether the dose of chemotherapy will need to be modified



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #2

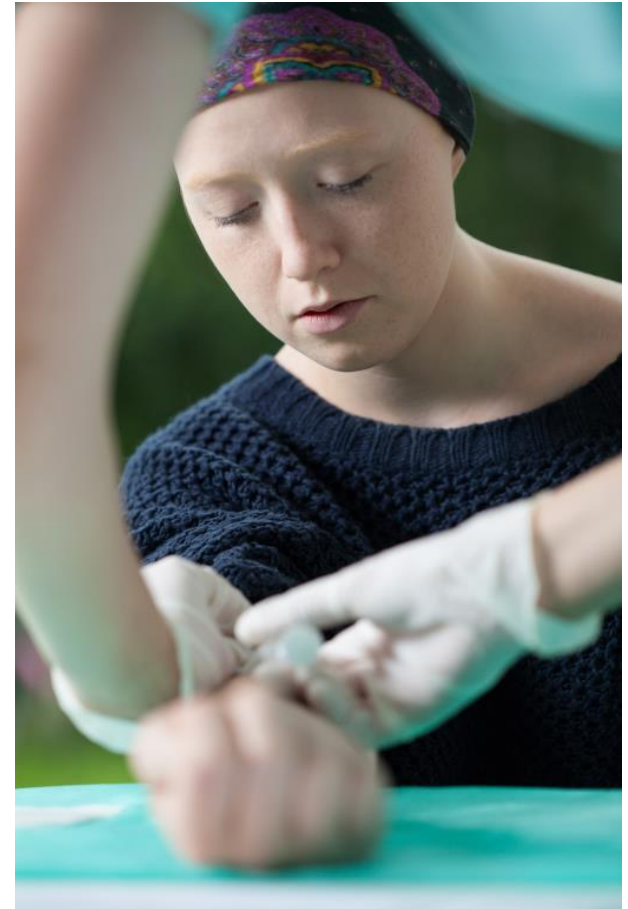
- **Preadministration Assessment**
- **Subjective Data**
 - Client's knowledge or understanding of the proposed chemotherapy regimen
 - Anxiety or fears the client may have regarding chemotherapy treatments
 - Previous or concurrent treatments (i.e., surgery, radiation)
 - Other current disorders such as CHF or peptic ulcer
 - Other factors (e.g., age, financial status, family involvement)



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #3

Ongoing Assessment

- Client's general condition
- Client's individual response to the drug
- Adverse reactions that may occur
- Guidelines established by the oncology healthcare provider or hospital
- Results of periodic laboratory tests and radiographic scans



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #4

Nursing Diagnosis

- Malnutrition related to anorexia, nausea, vomiting, and stomatitis
- Fatigue related to anemia and myelosuppression
- Injury Risk related to thrombocytopenia and myelosuppression
- Infection Risk related to neutropenia, leukopenia, and myelosuppression

Nursing Process—Client Receiving a Traditional Chemotherapy Drug #5

Nursing Diagnosis (continued)

- Altered Body Image Perception related to adverse reactions of antineoplastic drugs (e.g., alopecia, weight loss)
- Anxiety related to diagnosis, necessary treatment measures, the occurrence of adverse reactions, other factors
- Altered Tissue Integrity related to adverse reactions of the antineoplastic drugs (radiation recall and extravasation)

Nursing Process—Client Receiving a Traditional Chemotherapy Drug #6

Planning

- Expected client outcomes depend on the reason for administration of the traditional chemotherapy but include:
 - Optimal response to therapy
 - Management of adverse drug reactions
 - Confidence in an understanding of the prescribed medication regimen

Nursing Process—Client Receiving a Traditional Chemotherapy Drug #7

Implementation

- Promoting Optimal Response to Therapy
 - Guidelines established by the setting for care:
 - Increase frequency of monitoring vital signs if client's condition changes
 - Incorporate guidelines into nursing care plan with nursing observations and assessments geared to individual
 - Add further assessments to nursing care plan when client's condition changes

Nursing Process—Client Receiving a Traditional Chemotherapy Drug #8

Implementation

- Promoting Optimal Response to Therapy
 - Guidelines established by the setting for care (continued):
 - Consult with pharmacist regarding preparation and administration of drug, average dose ranges, and all adverse reactions, warnings, and precautions given by manufacturer for specific traditional chemotherapy drugs



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #9

Implementation

- Promoting Optimal Response to Therapy
 - Protection of the provider:
 - Follow the directions of the manufacturer regarding type of solution to be used for preparation, dilution, or administration
 - Follow Occupational Safety and Health Administration (OSHA) guidelines (preparation is to be performed in a biologic safety cabinet in designated area)

Nursing Process—Client Receiving a Traditional Chemotherapy Drug #10

Implementation

- Promoting Optimal Response to Therapy
 - Protection of the provider (continued):
 - Nurses need to be protected during administration and cleanup from accidental ingestion, inhalation, or absorption of drugs
 - Notify employers when they are pregnant or attempting to become pregnant



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #11

Implementation

- Promoting an Optimal Response to Therapy
 - Parenteral administration:
 - Give injection into large muscles using Z-track method if prescribed via IM route
 - Subcutaneous injection should include no more than 1 mL due to sting
 - Subcutaneous sites should be rotated, charted appropriately if the injections are given frequently

Nursing Process—Client Receiving a Traditional Chemotherapy Drug #12

Implementation

- Promoting an Optimal Response to Therapy
 - Parenteral administration (continued):
 - Check special directions for administration regarding IV delivery of traditional chemotherapy drug; special tubing or type of IV access needed (e.g., peripheral or central line).
 - Only nurses that are certified in chemotherapy can administer these drugs; any nurse can monitor clients receiving chemotherapy

Nursing Process—Client Receiving a Traditional Chemotherapy Drug #13

Implementation

- Monitoring and Managing Client Needs
 - **Malnutrition**
 - Assess nutritional status of client before and during treatment
 - Provide small, frequent meals to coincide with client's tolerance for food to stimulate appetite
 - Administer antiemetic before treatment if prescribed
 - Stress importance of eating meals high in nutritive value, particularly protein



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #14

Implementation

- Monitoring and Managing Client Needs
 - **Malnutrition (continued)**
 - Monitor client's body weight
 - Report white patches on tongue, throat, gums; burning sensation; bleeding from mouth or gums
 - Encourage mouth care



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #15

Implementation

- Monitoring and Managing Client Needs
 - **Fatigue**
 - Help client learn to prioritize activity to conserve energy
 - Monitor clients with thrombocytopenia for bleeding tendencies and take precautions to prevent bleeding
 - Apply pressure to injection sites for 3 to 5 minutes



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #16

Implementation

- Monitoring and Managing Client Needs
 - **Fatigue (continued)**
 - Apply pressure to injection site for 3 to 5 minutes to prevent bleeding into tissue and formation of hematoma
 - Inform client to avoid use of electric razors, nail trimmers, dental floss, firm toothbrushes, or any sharp objects and report signs of bleeding to the provider immediately



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #17

Implementation

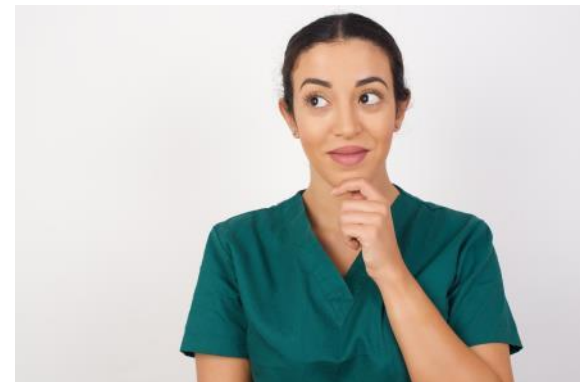
- Monitoring and Managing Client Needs
 - **Infection Risk**
 - Instruct client to avoid crowds or individuals who are ill while receiving myelosuppressive drugs
 - Report signs of infection to the provider (i.e., fever, cough, sore throat, chills, frequent urination, white blood cell count less than $2500/\text{mm}^3$)



Pharmacology in Practice Exercise #3

A client being treated with traditional chemotherapy is at a high risk for myelosuppression. Which of the following must the nurse consider with regard to injections and blood draws when the client is thrombocytopenic?

- a) Use the same site for all withdrawals and injections
- b) Apply pressure to the injection site for 3 to 5 minutes
- c) Use straight razors when shaving
- d) Keep the client's nails short



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #18

Implementation

- Monitoring and Managing Client Needs
 - **Disturbed Body Image Perception**
 - Inform client that hair loss may occur if hair loss is associated with antineoplastic drug being given
 - Forewarn client that hair loss may occur suddenly, in large amounts, and can affect all hair on the body
 - Assist in making plans for purchase of wig or cap to disguise hair loss until hair grows back



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #19

Implementation

- Monitoring and Managing Client Needs
 - **Anxiety**
 - Offer empathetic, emotional support to client and family members
 - Provide client and family education and instructional materials in the language preferred by the client



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #20

Implementation

- Monitoring and Managing Client Needs
 - **Altered Tissue Integrity**
 - Instruct client to avoid the sun, wear loose-fitting and protective clothing, and to watch skinfolds for breakdown
 - Inform clients that chemotherapy can sensitize skin that has been previously irradiated as it can be both surprising and painful



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #21

Implementation

- Monitoring and Managing Client Needs
 - **Altered Tissue Integrity (continued)**
 - Monitor IV site continuously and check for blood return frequently during IV push procedures
 - Ensure that extravasation protocol orders are signed and extravasation kit is on unit before vesicant drugs are administered



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #22

Implementation—Educating the Client and Family

- Include the following points in the client and family teaching plan:
 - Take drug only as directed and do not alter the dose unless advised
 - All recommendations given by the oncology healthcare provider are important
 - Effectiveness or action of the drug could be altered if these directions are ignored
 - Keep all appointments for chemotherapy, lab tests, and with the oncology healthcare provider or clinic

Nursing Process—Client Receiving a Traditional Chemotherapy Drug #23

Implementation—Educating the Client and Family (continued)

- Include the following points in the client and family teaching plan:
 - Do not take nonprescription drug unless approved by primary healthcare provider
 - Avoid drinking alcoholic beverages unless approved by primary healthcare provider
 - Inform physicians, dentists, medical personnel of therapy with this drug



Nursing Process—Client Receiving a Traditional Chemotherapy Drug #24

Evaluation

- Was the therapeutic effect achieved?
- Were adverse reactions: identified, reported, and managed?
 - Client maintains adequate nutrition status
 - Client reports fatigue is manageable
 - No evidence of injury is seen
 - Perceptions of body image changes are managed successfully
 - Skin remains intact
- Did client and family express confidence and demonstrate understanding of drug regimen?

Turn and Talk—Case Study

A client recently diagnosed with carcinoma, is receiving chemotherapy with the drug vincristine (Oncovin).

1. In what class of traditional chemotherapy or antineoplastic drugs is vincristine , and what is its mechanism of action?
2. After the administration of vincristine to the client, what factors does the nurse base the ongoing assessment?
3. Common adverse reactions to many antineoplastic drugs include bone marrow suppression, stomatitis, diarrhea, and hair loss. Why is this?

