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CLINICAL DRUG THERAPY

Rationales for Nursing Practice

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- Review of dosage calculations
- NCLEX-style questions

Anne Collins Abrams
Sandra Smith Pennington
Carol Barnett Lammon

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CLINICAL DRUG THERAPY

Rationales for Nursing Practice

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PREFACE

PURPOSE

The basic precepts underlying previous editions of *Clinical Drug Therapy* also guided the writing of this eighth edition. The overall purpose is to promote safe, effective, and rational drug therapy by

- Providing information that accurately reflects current practices in drug therapy
- Facilitating the acquisition, comprehension, and application of knowledge related to drug therapy. Application requires knowledge about the drug and the client receiving it.
- Identifying knowledge and skills the nurse can use to smooth the interface between a drug and the client receiving it

GOALS AND RESPONSIBILITIES OF NURSING CARE RELATED TO DRUG THERAPY

- Preventing the need for drug therapy, when possible, by promoting health and preventing conditions that require drug therapy
- Using appropriate and effective nonpharmacologic interventions instead of, or in conjunction with, drug therapy when indicated. When used with drug therapy, such interventions may promote lower drug dosage, less frequent administration, and fewer adverse effects.
- Enhancing therapeutic effects by administering drugs accurately and considering clients' individual characteristics that influence responses to drug therapy
- Preventing or minimizing adverse drug effects by knowing the major adverse effects associated with particular drugs, identifying clients with characteristics that may increase their risks of experiencing adverse effects, and actively monitoring for the occurrence of adverse effects. When adverse effects occur, early recognition allows interventions to minimize their severity. Because all drugs may cause adverse effects, nurses must maintain a high index of suspicion that signs and symptoms, especially new ones, may be drug induced.
- Teaching clients and caregivers about accurate administration of medications, nonpharmacologic treatments to use with or instead of pharmacologic treatments, and when to contact a health care provider

ORGANIZATIONAL FRAMEWORK

The content of *Clinical Drug Therapy* is organized into ten sections, primarily by therapeutic drug groups and their effects on particular body systems. This approach helps students make logical connections between major drug groups and the conditions for which they are used. It also provides a foundation for learning about new drugs, most of which fit into known groups.

The first section contains the basic information required to learn, understand, and apply drug knowledge. The chapters in this section include information about drug names, classifications, prototypes, costs, laws and standards, schedules of controlled substances, drug approval processes, and learning strategies (Chapter 1); cellular physiology, drug transport, pharmacokinetic processes, the receptor theory of drug action, types of drug interactions, and factors that influence drug effects on body tissues (Chapter 2); dosage forms and routes and methods of accurate drug administration (Chapter 3); and guidelines for using the nursing process in drug therapy and general principles of drug therapy (Chapter 4).

Most drug sections include an initial chapter that reviews the physiology of a body system, followed by several chapters that discuss drug groups used to treat disorders of that body system. The seven physiology review chapters are designed to facilitate understanding of drug effects on a body system. These include the central nervous system; the autonomic nervous system; and the endocrine, hematopoietic and immune, respiratory, cardiovascular, and digestive systems. Other chapters within each section emphasize therapeutic classes of drugs and prototypical or commonly used individual drugs, those used to treat common disorders, and those likely to be encountered in clinical nursing practice. Drug chapter content is presented in a consistent format and includes a description of a condition (or conditions) for which a drug group is used; a general description of a drug group, including mechanism(s) of action, indications for use, and contraindications; and descriptions and tables of individual drugs, with recommended dosages and routes of administration.

Additional clinically relevant information is presented under the headings of **Nursing Process, Principles of Therapy,** and **Nursing Actions.**

Nursing Process sections emphasize the importance of the nursing process in drug therapy, including assessment of the client's condition in relation to the drug group, nursing diagnoses, expected outcomes, needed interventions, and evaluation

of the client's progress toward expected outcomes. **Client Teaching Guidelines** are displayed separately from other interventions to emphasize their importance and for easy student reference.

Principles of Therapy sections present guidelines for maximizing benefits and minimizing adverse effects of drug therapy in various circumstances and populations, including middle-aged and older adults, children and adolescents, and clients with impaired kidney or liver function. General principles are included in Chapter 4; specific principles related to drug groups are included in the chapters where those drug groups are discussed. This approach, rather than separate chapters on pediatric and geriatric pharmacology, for example, was chosen because knowledge about a drug is required before that knowledge can be applied to a specific population with distinctive characteristics and needs in relation to drug therapy.

Each drug chapter includes a **Nursing Actions** display that provides specific nursing responsibilities related to drug administration and client observation.

Other drug sections include products used to treat infectious, ophthalmic, and dermatologic disorders plus drugs used during pregnancy, labor and delivery, and lactation.

NEW TO THIS EDITION

This thoroughly updated edition includes new content and features:

- **Updated Drug Information.** Many new drugs have been added: some are additions to well-known drug groups, such as antidiabetic drugs (Chapter 26) and antiretroviral drugs (Chapter 35); others represent advances in the drug therapy of some disease processes, such as newer anticancer agents (Chapter 42).

  In addition, continuing trends in drug dosage formulations are reflected in the increased numbers of fixed-dose combination drug products, long-acting preparations, and nasal or oral inhalation products.
- **Major Revision of Many Chapters.** Chapter revisions reflect current practices in drug therapy, integrate new drugs, and explain the major characteristics of new drug groups.
- **Applying Your Knowledge.** These threaded case studies provide real-world examples and lend significance to conceptual content. Each drug chapter opens with a client scenario, which builds throughout the chapter. Case-based questions test students' critical thinking, and special "How Do You Avoid This Medication Error?" questions promote safe and accurate drug administration.
- **Research Briefs.** The briefs summarize important research related to drug therapy and provide nursing implications.
- **New Illustrations.** Several new illustrations have been developed to enhance understanding of drug actions.

SPECIAL FEATURES

- **Four-Color Design.** The striking design enhances the liveliness of the text and promotes student interest and interactivity.
- **Readability.** Since the first edition of *Clinical Drug Therapy* was published in 1983, many students and faculty have commented about the book's clear presentation style.
- **Organizational Framework.** The book's organizational framework allows it to be used effectively as both a textbook and as a reference. Used as a textbook, students can read chapters in their entirety to learn the characteristics of major drug classes, their prototypical drugs or commonly used representatives, their uses and effects in prevention or treatment of disease processes, and their implications for nursing practice. Used as a reference book, students can readily review selected topics for classroom use or clinical application. Facilitating such uses are a consistent format and frequent headings that allow readers to identify topics at a glance.
- **Chapter Objectives.** Learning objectives at the beginning of each chapter focus students' attention on important chapter content.
- **Drugs at a Glance Tables.** These tables highlight and summarize pertinent drug information, including drug names, dosages, and other related facts.
- **Boxed Displays.** These include information to promote understanding of drug therapy for selected conditions.
- **Herbal and Dietary Supplements.** Commonly used products are introduced in Chapter 4 and included in selected later chapters. Safety aspects are emphasized.
- **Client Teaching Guidelines.** This feature is designed to meet several goals. One is to highlight the importance of teaching clients and caregivers how to manage drug therapy at home, where most medications are taken. This is done by separating teaching from other nursing interventions. Another goal is to promote active and knowledgeable client participation in drug therapy regimens, which helps to maximize therapeutic effects and minimize adverse effects. In addition, written guidelines allow clients and caregivers to have a source of reference when questions arise in the home setting. A third goal is to make client teaching easier and less time consuming. Using the guidelines as a foundation, the nurse can simply add or delete information according to a client's individual needs. To assist both the nurse and client further, the guidelines contain minimal medical jargon.
- **Principles of Therapy.** This unique section describes important drug- and client-related characteristics that need to be considered in drug therapy regimens. Such considerations can greatly increase safety and therapeutic effects, and all health care providers associated with drug therapy should be aware of them. Most chap-

ters contain principles with the headings of **Use in Children, Use in Older Adults, Use in Clients with Renal Impairment, Use in Clients with Hepatic Impairment,** and **Use in Home Care** to denote differences related to age, developmental level, pathophysiology, and setting. Some chapters include principles related to these headings as well: **Genetic and Ethnic Considerations, Use in Critical Illness,** and **Management of Drug Toxicity or Drug Withdrawal.**

- **Nursing Actions Displays.** These displays emphasize nursing interventions during drug therapy within the following categories: Administer accurately, Observe for therapeutic effects, Observe for adverse effects, and Observe for drug interactions. The inclusion of rationales for interventions provides a strong knowledge base and scientific foundation for clinical practice and critical thinking.
- **Review and Application Exercises.** Located at the end of each chapter, these exercises include two types of questions. **Short Answer** questions encourage students to rehearse clinical application strategies in a nonclinical, nonstressful, nondistracting environment. They also promote self-testing in chapter content and can be used to promote classroom discussion. To help students prepare for the licensing examination, this edition adds **NCLEX-style** questions to each drug chapter. Answers and rationales for these exercises can be found on the **Instructor's Resource CD-ROM.**
- **Appendices.** These include recently approved and miscellaneous drugs, the International System of Units, therapeutic serum drug concentrations for selected drugs, Canadian drug laws and standards, Canadian drug names, and anesthetics.
- **Extensive Index.** Listings of generic and trade names of drugs, nursing process, and other topics provide rapid access to desired information.

TEACHING–LEARNING PACKAGE

Nursing students must develop skills in critical thinking, information processing, decision making, collaboration, and problem solving. How can a teacher assist students to develop these skills in relation to drug therapy? The ancillary package assists both students and teachers in this development.

The **Study Guide** engages students' interest and active participation by providing a variety of learning exercises and opportunities to practice cognitive skills. Worksheets promote the learning of concepts, principles, and characteristics and uses of major drug groups and can be completed independently or by small groups as in-class learning activities. Applying Your Knowledge scenarios promote appropriate data collection, critical analysis of both drug- and client-related data, and application of the data in client care.

The **Connection** companion Web site, http://connection.lww.com/go/abrams8e, provides online updates for faculty and students, links to newly approved drugs, and more.

The free **Student Resource CD-ROM** is an invaluable learning tool that provides 3-D animated demonstrations of pharmacology concepts, medication administration video, NCLEX-style review questions, and monographs of the most commonly prescribed drugs.

The **Instructor's Resource CD-ROM** facilitates use of the text in designing and implementing courses of study. To fulfill this purpose, the CD-ROM contains

- General observations and comments about teaching and learning pharmacology in relation to nursing
- A sample syllabus for a separate 3-credit-hour, 1-semester pharmacology course that may be taught in a traditional classroom or a nontraditional, online setting
- General teaching strategies for pharmacology and specific teaching strategies for each chapter
- Answers to the review exercises from the book
- Brownstone test bank that includes approximately 1,000 multiple-choice test items in NCLEX format, a test generator, and a grade book. These materials can assist the instructor in evaluating students' knowledge of drug information and their ability to apply that information in client care.
- PowerPoint slides that include text and art from *Clinical Drug Therapy* to provide significant classroom or online teaching support.

These varied materials allow each instructor to choose or adapt them relevant to his or her circumstances. The authors and publisher hope these resources are truly helpful in easing the day-to-day rigors of teaching pharmacology and invite comments from instructors regarding the materials.

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HOW TO USE Clinical Drug Therapy

Drugs at a Glance tables give students characteristics as well as routes and dosage ranges in an easy-to-read format. **Prototype drugs** are highlighted in the tables and in the text.

Table 6-1 Drugs at a Glance: Opioid Analgesics

GENERIC/TRADE NAME	ROUTES AND DOSAGE RANGES: Adults	ROUTES AND DOSAGE RANGES: Children
Agonists		
Codeine	*Pain*: PO, Sub-Q, IM 15–60 mg q4–6h PRN; usual dose 30 mg; maximum, 360 mg/24 h *Cough*: PO 10–20 mg q4h PRN; maximum, 120 mg/24 h	*1 y or older, Pain*: PO, Sub-Q, IM 0.5 mg/kg q4–6h PRN *2–6 y, Cough*: PO 2.5–5 mg q4–6h; maximum, 30 mg/24 h *6–12 y, Cough*: PO 5–10 mg q4–6h; maximum, 60 mg/24 h
Fentanyl (Sublimaze)	Preanesthetic sedation, IM 0.05–0.1 mg 30–60 min before surgery Analgesic adjunct to general anesthesia, IV total dose of 0.002–0.05 mg/kg, depending on the surgical procedure Adjunct to regional anesthesia, IM or slow IV (over 1–2 min) 0.05–0.1 mg PRN Postoperative analgesia, IM 0.05–0.1 mg, repeat in 1–2 h if needed General anesthesia, IV 0.05–0.1 mg/kg with oxygen and a muscle relaxant (maximum dose 0.15 mg/kg with open-heart surgery, other major surgeries, and complicated neurologic or orthopedic procedures) Chronic pain, transdermal system 2.5–10 mg every 72 h	*Weight at least 10 kg*: Conscious sedation or preanesthetic sedation, 5–15 mcg/kg of body weight (100–400 mcg), depending on weight, type of procedure, and other factors. Maximum dose, 400 mcg, regardless of age and weight. *2–12 y*: General anesthesia induction and maintenance, IV 2–3 mcg/kg

OBJECTIVES

After studying this chapter, you will be able to:

1. Identify types and potential causes of seizures.
2. Discuss major factors that influence choice of an antiseizure drug for a client with a seizure disorder.
3. Give characteristics and effects of commonly used antiseizure drugs.
4. Differentiate between older and more recent antiseizure drugs.
5. Compare advantages and disadvantages between monotherapy and combination drug therapy for seizure disorders.
6. Apply the nursing process with clients receiving antiseizure drugs.
7. Describe strategies for prevention and treatment of status epilepticus.
8. Discuss the use of antiseizure drugs in special populations.

Chapter Objectives let students know what they're going to learn in each and every chapter.

APPLYING YOUR KNOWLEDGE 10-1: HOW CAN YOU AVOID THIS MEDICATION ERROR?

Mr. Mehring is talking with his pastor when you arrive to administer his medication. He asks you to just leave the medication and he will take it when he finishes his visit. You leave the medication with Mr. Mehring and chart it as given.

APPLYING YOUR KNOWLEDGE: ANSWERS

10-1 The nurse should never leave an antidepressant at the bedside. Charting the medication as given when it has not yet been taken by the client is not truthful, and the client may forget to take the medication or may hold the medication for a later time and save up multiple doses. This is especially problematic with a client suffering from depression because he or she may have suicidal ideations.

10-2 Some antidepressant medications, such as sertraline, are in the class of selective serotonin reuptake inhibitors (SSRIs), which may not reach a therapeutic effect for up to 2 to 4 weeks. Provide appropriate teaching for both the client and his wife regarding therapeutic effect. Check to make sure that Mr. Mehring is taking the right dosage. Encourage him to continue taking the medication.

10-3 Check with the physician to see if Mr. Mehring's dose can be taken once a day in the morning. If this is not possible, then check to see if a different SSRI can be given that has once-a-day dosing. Taking the dose *in the morning may solve Mr. Mehring's sleeping difficulty* if the problem is due to the drug and not due to the depression.

APPLYING YOUR KNOWLEDGE

While in the hospital, Carl Mehring, age 70, is diagnosed with chronic depression secondary to his chronic heart failure, hypertension, diabetes mellitus, and renal insufficiency. As Mr. Mehring's health has declined, so has his interest in his family, friends, and hobbies. His physician prescribes sertraline 50 mg PO twice a day.

Applying Your Knowledge features help students apply concepts to client care. Most chapters open with a client scenario, which is then carried through the chapter. Applying Your Knowledge questions require students to take the content they have learned and apply it to the client in the case study, and special "How Do You Avoid This Medication Error?" questions reinforce safe drug administration. Answers are provided at the end of each chapter, allowing students to monitor their progress.

Nursing Process material helps students think about drug therapy in terms of the nursing process.

400 mg three times a day) and deciding for themselves whether their symptoms improve (eg, less pain, improved ability to walk) and whether they want to continue.

NURSING PROCESS

Assessment

- Assess for signs and symptoms of pain, such as location, severity, duration, and factors that cause or relieve the pain (see Chap. 6).
- Assess for fever (thermometer readings above 99.6°F [37.3°C] are usually considered fever). Hot, dry skin; flushed face; reduced urine output; and concentrated urine may accompany fever if the person also is dehydrated.
- Assess for inflammation. Local signs are redness, heat, edema, and pain or tenderness; systemic signs include fever, elevated white blood cell count (leukocytosis), and weakness.
- With arthritis or other musculoskeletal disorders, assess for pain and limitations in activity and mobility.
- Ask about use of OTC analgesic, antipyretic, or anti-inflammatory drugs and herbal or dietary supplements.
- Ask about allergic reactions to aspirin or NSAIDs.
- Assess for history of peptic ulcer disease, GI bleeding, or kidney disorders.
- With migraine, assess severity and patterns of occurrences.

Nursing Diagnoses

- Acute Pain
- Chronic Pain
- Activity Intolerance related to pain
- Risk for Poisoning: Acetaminophen overdose
- Risk for Injury related to adverse drug effects (GI bleeding, renal insufficiency)
- Deficient Knowledge: Therapeutic and adverse effects of commonly used drugs
- Deficient Knowledge: Correct use of OTC drugs for pain, fever, and inflammation

Planning/Goals

The client will

- Experience relief of discomfort with minimal adverse drug effects
- Experience increased mobility and activity tolerance
- Inform health care providers if taking aspirin, an NSAID or acetaminophen regularly.
- Self-administer the drugs safely
- Avoid overuse of the drugs
- Use measures to prevent accidental ingestion or overdose, especially in children
- Experience fewer and less severe attacks of migraine

Interventions

Implement measures to prevent or minimize pain, fever, and inflammation.

- Treat the disease processes (eg, infection, arthritis) or circumstances (eg, impaired blood supply, lack of physical activity, poor positioning or body alignment) thought to be causing pain, fever, or inflammation.
- Treat pain as soon as possible; early treatment may prevent severe pain and anxiety and allow the use of milder analgesic drugs. Use distraction, relaxation techniques, or other nonpharmacologic techniques along with drug therapy, when appropriate.
- With acute musculoskeletal injuries (eg, sprains), cold applications can decrease pain, swelling, and inflammation. Apply for approximately 20 minutes, then remove.
- Assist clients with migraine to identify and avoid "triggers." Assist clients to drink 2 to 3 liters of fluid daily when taking an NSAID regularly. This strategy decreases gastric irritation and helps to maintain good kidney function. With long-term use of aspirin, fluids help to prevent precipitation of salicylate crystals in the urinary tract. With antigout drugs, fluids help to prevent precipitation of urate crystals and formation of urate kidney stones. Fluid intake is especially important initially when serum uric acid levels are high and large amounts of uric acid are being excreted.

Provide appropriate teaching for any drug therapy (see accompanying displays).

Evaluation

- Interview and observe regarding relief of symptoms.
- Interview and observe regarding mobility and activity levels.
- Interview and observe regarding safe, effective use of the drugs.
- Select drugs appropriately.

APPLYING YOUR KNOWLEDGE 7–3
Given Julie's medication regimen, what nursing measures should be implemented to decrease the probability of GI bleeding?

PRINCIPLES OF THERAPY

Use of Aspirin

When pain, fever, or inflammation is present, aspirin is effective across a wide range of clinical conditions. Like any other drug, aspirin must be used appropriately to maximize therapeutic benefits and minimize adverse reactions.

CLIENT TEACHING GUIDELINES

Antianxiety and Sedative-Hypnotic Drugs

General Considerations

- "Nerve pills" and "sleeping pills" can relieve symptoms temporarily, but they do not cure or solve the underlying problems. With rare exceptions, these drugs are recommended only for short-term use. For long-term relief, counseling or psychotherapy may be more beneficial because it can help you learn other ways to decrease your nervousness and difficulty in sleeping.
- Use nondrug measures to promote relaxation, rest, and sleep when possible. Physical exercise, reading, craft work, stress management, and relaxation techniques are safer than any drug.
- Try to identify and avoid factors that cause nervousness or insomnia, such as caffeine-containing beverages and stimulant drugs. This may prevent or decrease the severity of nervousness or insomnia so that sedative-type drugs are not needed. If the drugs are used, these factors can cancel or decrease the drugs' effects. Stimulant drugs include asthma and cold remedies and appetite suppressants.
- Most "nerve pills" and "sleeping pills" belong to the same chemical group and have similar effects, including the ability to decrease nervousness, cause drowsiness, and cause dependence. Thus, there is no logical reason to take a combination of the drugs for anxiety, or to take one drug for daytime sedation and another for sleep. Ativan, Xanax, Valium, and Restoril are commonly used examples of this group, but there are several others as well.
- Inform all health care providers when taking a sedative-type *medication, preferably by the generic and trade names. This helps* avoid multiple prescriptions of drugs with similar effects and reduces the risk of serious adverse effects from overdose.
- Do not perform tasks that require alertness if drowsy from medication. The drugs often impair mental and physical functioning, especially during the first several days of use, and thereby them produces additive depression and may lead to excessive drowsiness, difficulty breathing, traumatic injuries, and other potentially serious adverse drug effects.
- Store drugs safely, out of reach of children and adults who are confused or less than alert. Accidental or intentional ingestion may lead to serious adverse effects. Also, do not keep the drug container at the bedside, because a person sedated by a previous dose may take additional doses.
- Do not share these drugs with anyone else. These mind-altering, brain-depressant drugs should be taken only by those people for whom they are prescribed.
- Do not stop taking a Valium-related drug abruptly. Withdrawal symptoms can occur. When being discontinued, dosage should be gradually reduced, as directed by and with the supervision of a health care provider.
- Do not take "sleeping pills" every night. These drugs lose their effectiveness in 2–4 weeks if taken nightly, and cause sleep disturbances when stopped.
- Alprazolam (Xanax) is sometimes confused with ranitidine (Zantac), a drug for heartburn and peptic ulcers.

Self-Administration

- Follow instructions carefully about how much, how often, and how long to take the drugs. These drugs produce more beneficial effects and fewer adverse reactions when used in the smallest effective doses and for the shortest duration feasible in particular *circumstances. All of the Valium-related drugs, zaleplon (Sonata),* and zolpidem (Ambien) can cause physical dependence, which may eventually cause worse problems than the original anxiety or insomnia.
- Take sleeping pills just before going to bed so that you are lying down when the expected drowsiness occurs.

Client Teaching Guidelines give students specific information they may need to educate patients.

Herbal and Dietary Supplement content is highlighted so students become aware of how these alternative therapies can affect traditional medications.

Herbal Supplement

St. John's wort (*Hypericum perforatum*) is an herb that is widely self-prescribed for depression. Several studies, most of which used about 900 milligrams daily of a standardized extract, indicate its usefulness in mild to moderate depression, with fewer adverse effects than antidepressant drugs. A 3-year, multicenter study by the National Institutes of Health concluded that the herb is not effective in major depression.

Antidepressant effects are attributed mainly to hypericin, although several other active components have also been identified. The mechanism of action is unknown, but the herb is thought to act similarly to antidepressant drugs. Some herbalists refer to St. John's wort as "natural Prozac."

Adverse effects, which are usually infrequent and mild, include constipation, dizziness, dry mouth, fatigue, GI distress, nausea, photosensitivity, restlessness, skin rash, and sleep disturbances. These symptoms are relieved by stopping the herb.

Drug interactions may be extensive. St. John's wort should not be combined with alcohol, antidepressant drugs (eg, MAO inhibitors, SSRIs, TCAs), nasal decongestants or other over-the-counter cold and flu medications, bronchodilators, opioid analgesics, or amino acid supplements containing phenylalanine and tyrosine. All of these interactions may result in hypertension, possibly severe.

N U R S I N G A C T I O N S

Antiseizure Drugs

NURSING ACTIONS	RATIONALE/EXPLANATION
1. Administer accurately	
a. Give on a regular schedule about the same time each day.	To maintain therapeutic blood levels of drugs
b. Give most oral antiseizure drugs after meals or with a full glass of water or other fluid; levetiracetam, oxcarbazepine, topiramate, and zonisamide may be taken with or without food.	Most antiseizure drugs cause some gastric irritation, nausea, or vomiting. Taking the drugs with food or fluid helps decrease gastrointestinal side effects.
c. To give phenytoin:	
(1) Shake oral suspensions of the drug vigorously before pouring and always use the same measuring equipment.	In suspensions, particles of drug are suspended in water or other liquid. On standing, drug particles settle to the bottom of the container. Shaking the container is necessary to distribute drug particles in the liquid vehicle. If the contents are not mixed well every time a dose is given, the liquid vehicle will be given initially, and the concentrated drug will be given later. That is, underdosage will occur at first, and little if any therapeutic benefit will result. Overdosage will follow, and the risks of serious toxicity are greatly increased. Using the same measuring container ensures consistent dosage. Calibrated medication cups or measuring teaspoons or tablespoons are acceptable. Regular household teaspoons and tablespoons used for eating and serving are not acceptable because sizes vary widely.
(2) Do not mix parenteral phenytoin in the same syringe with any other drug.	Phenytoin solution is highly alkaline (pH approximately 12) and physically incompatible with other drugs. A precipitate occurs if mixing is attempted.
(3) Give phenytoin as an undiluted intravenous (IV) bolus injection at a rate not exceeding 50 mg/min, then flush the IV line with normal saline or dilute in 50–100 mL of normal saline (0.9% NaCl) and administer over approximately 30–60 minutes. If piggybacked into a primary IV line, the primary IV solution must be normal saline or the line must be flushed with normal saline before and after administration of phenytoin. An in-line filter is recommended.	Phenytoin cannot be diluted or given in IV fluids other than normal saline because it precipitates within minutes. Slow administration and dilution decrease local venous irritation from the highly alkaline drug solution. Rapid administration must be avoided because it may produce myocardial depression, hypotension, cardiac dysrhythmias, and even cardiac arrest.
d. To give IV fosphenytoin:	
(1) Check the physician's order and the drug concentration carefully.	The dose is expressed in phenytoin equivalents (PE; fosphenytoin 50 mg PE = phenytoin 50 mg).
(2) Dilute the dose in 5% dextrose or 0.9% sodium chloride solution to a concentration of 1.5 mg PE/mL to 25 mg PE/mL and infuse no faster than 150 mg PE/min.	The drug is preferably diluted in the pharmacy and labeled with the concentration and duration of the infusion. For a 100-mg PE dose, diluting with 4 mL yields the maximum concentration of 25 mg PE/mL; this amount could be infused in about 1 min at the maximal recommended rate. A 1-g loading dose could be added to 50 mL of 0.9% sodium chloride and infused in approximately 10 min at the maximal recommended rate.
(3) Consult a pharmacist or the manufacturer's literature if any aspect of the dose or instructions for administration are unclear.	To avoid error
e. To give carbamazepine and phenytoin suspensions by nasogastric (NG) feeding tube, dilute with an equal amount of	Absorption is slow and decreased, possibly because of drug adherence to the NG tube. Dilution and tube irrigation decrease such adherence.

Nursing Actions give students specific instructions on administration of drugs and observations of client responses, with rationales for each step.

Review and Application Exercises provide students with the opportunity to review what they just learned. These include both short-answer exercises and NCLEX-style questions.

APPLYING YOUR KNOWLEDGE: ANSWERS

11-1 Monitor the phenytoin level. The normal free phenytoin level is 0.8 to 2 mcg/mL. Adequate serum levels are needed for seizure control.

11-2 Ask if Frank is taking a monoamine oxidase (MAO) inhibitor, which may be used to treat depression. Carbamazepine should not be taken within 14 days of an MAO inhibitor.

11-3 The client must always taper the dosage of an AED gradually, or the seizures may exacerbate.

Review and Application Exercises

Short Answer Exercises

1. For a client with a newly developed seizure disorder, why is it important to verify the type of seizure by electroencephalogram before starting AEDs?
2. What are the indications for use of the major AEDs?
3. What are the major adverse effects of commonly used AEDs, and how can they be minimized?
4. What are the advantages and disadvantages of treatment with a single drug and of treatment with multiple drugs?
5. Which of the benzodiazepines are used as AEDs?
6. What are the advantages of carbamazepine and valproic acid compared with the benzodiazepines, phenytoin, and phenobarbital?
7. How are the newer drugs similar to or different from phenytoin?
8. What is the treatment of choice for an acute convulsion or status epilepticus?
9. Why is it important when teaching clients to emphasize that none of the AEDs should be stopped abruptly?
10. How can a home care nurse monitor AED therapy during a home visit?

NCLEX-Style Questions

11. An 18-year-old client presents to the clinic with complaints of breast tenderness, nausea, vomiting, and absence of menses for 2 months. She has a history of a seizure disorder that is well controlled with oxcarbazepine (Trileptal). She believes that she has been taking her oral contraceptives as directed but asks if she could be pregnant. The nurse recognizes that the best response to the client's question is which of the following?
    a. "Oxcarbazepine can decreases the effectiveness of oral contraceptive drugs, so we need to do a pregnancy test."
    b. "You can't be pregnant if you have been taking your pills correctly."
    c. "Don't worry; birth control pills are very effective."
    d. "Taking antiseizure drugs with oral contraceptives significantly decreases your risk of pregnancy."
12. A client scheduled for her next dose of phenytoin (Dilantin) has a serum phenytoin level of 16 mcg/mL. Based on this information, the nurse should do which of the following?
    a. Administer the drug.

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