Chapter 23
Medication Administration

Pharmacology

- This is the study of drugs and their action on the living body.
- The action of any drug on the body is a complicated process.

- Pharmaceutical Phase
  - The discovery or making of the drug

- Pharmacokinetic Phase
  - The movement of the drug’s active ingredients to the site where the intended action of the drug

- Pharmacodynamic Phase
  - Interaction of the drug’s active ingredient with the body’s cells
Pharmacology

- **Drug Dosage**
  - The amount of a drug prescribed for the patient by the physician.
  - The prescribed amount/dose of drug given at one time.

Pharmacology

- **Drug Actions and Interactions**
  - Two general types
    - **Local**: affect only the area where the drug is placed
    - **Systemic**: affect the entire body

- **Drug interaction**: one drug alters another drug
  - **Potentiation**: one drug increases the action or effect of another drug
  - **Incompatibility**: drugs that do not combine chemically with other drugs
  - **Antagonist**: drug that will block the action of another drug
Idiosyncratic response to a drug is an individual’s unique hypersensitivity to a particular drug.

A reduced response to a drug is called tolerance.

An adverse drug reaction is a harmful, unintended reaction to a drug administered at a normal dosage.

Contraindications are conditions under which the drug should not be given.

Interactions are modifications of the effect of a drug when administered with another drug.

Pharmacology

Factors that may affect how patients respond to medication: What do think?

- Age
- Weight
- Physical health
- Psychological status
- Environmental temperature
- Gender
- Amount of food in the stomach
- Dosage forms

Medication Orders

- The PT is ethically and legally responsible for ensuring that the patient receives the correct medication ordered by the physician.
- Medication orders should include the following:
  - Patient's name
  - Date and time of the order
  - Name of the drug
  - Dosage of the drug
  - Route of administration
  - Time or frequency drug is given
  - Signature of the physician
  - Any special instructions
**Medication Orders**

- **Controlled Substances**
  - Opioids, barbiturates, and other controlled drugs that have a high possibility for abuse or addiction are double-locked.
  - "Narcotic keys" are kept by designated med person per shift.
  - Each controlled drug used is logged into the narcotic log book.
  - At the end of each shift, controlled drugs are carefully counted by a team member from the outgoing shift and a team member from the incoming shift.
  - Always have a witness to the "wasting" of a controlled substance.

- **Types of Orders**
  - **Standing Orders**
    - Already written by a physician for all patients on a particular unit or area
    - Carried out without having to call the physician
  - **Verbal Orders**
    - May be given in the presence of an PT, LPN/LVN or an RN directly or over the telephone
    - Should be written on the chart and signed by the physician as soon as possible (policy & procedure)

**Medication Administration**

- **Six Rights**
  - Right medication
  - Right dose
  - Right time
  - Right route
  - Right patient
  - Right documentation
Medication Orders

- Important Considerations of Medication Administration.
  - Everyone read out loud!
  - If you did not pour it, do not give it.
  - If you gave it, chart it.
  - Do not chart for someone else or have someone else chart for you.
  - Do not transport or accept a container that is not labeled.
  - Do not put down an unlabeled syringe.
  - If given a verbal order, repeat it to the physician.
  - If you make an error, report it immediately.

- Never leave a medication with a patient or family member. Watch the patient take it and swallow it.
- Always return to assess the patient’s response.
- Chart as soon as possible after giving medication.
- If a patient refuses medication, do not force it; chart "Refused medication because of… ."
- If you elect to omit a dose based on your nursing judgment, let another PT or nurse help make the decision. If medication is not given, document "Dose omitted because… ." Report to the physician.

Routes of Administration

- Enteral
  - Via the GI Tract
    - Powders
    - Pills
    - Tablets
    - Liquids or suspensions
    - Suppositories
**Routes of Administration**

- **Percutaneous**
  - Through the Skin or Mucous Membranes
    - Topical
    - Instillation
    - Inhalation

- **Parenteral**
  - Methods Other than the GI Tract; Needle Route
    - Ampules
    - Vials
    - Intramuscular
    - Subcutaneous
    - Intradermal
    - Intravenous

**Enteral Administration**

- Preparation of Tablets, Pills, and Capsules
  - These preparations enter the GI tract and are absorbed more slowly into the bloodstream than via any other route.
  - The slow absorption rate makes the PO (by mouth) route relatively safe.
  - Some PO medications are irritating to the patient’s GI tract, and larger tablets may be difficult for some patients to swallow.
Skill 23-1: Step 5

Administering tablets, pills, and capsules.

Enteral Administration

- Preparation of Liquid Medications
  - Liquid medications are often given to children; to patients who cannot swallow tablets, pills, or capsules; and to geriatric patients.
  - Medications may be given via a nasogastric, gastrostomy, or jejunostomy tube.
  - Liquids must not be given to unconscious patients because of the possibility of aspirating.

Skill 23-2: Step 13

Administering liquid medications.
**Enteral Administration**

- **Tubal Medications**
  - Nasogastric (NG) tubes are used to administer liquid medications to unconscious patients, dysphagic patients, and those who are too ill to eat.
  - Many medications come in liquid form; if they do not, solid tablets may be pulverized in a mortar and pestle, and capsules can be opened.
  - Not all tablets are safe to use when crushed, and not all capsules are safe to use when opened.

**Skill 23-3: Step 13**

Administering tubal medications.

**Skill 23-3: Step 16**

Administering tubal medications.
Enteral Administration

- **Suppositories**
  - Cone-shaped, egg-shaped, or spindle-shaped medication made for insertion into the rectum or vagina.
  - Dissolves at body temperature and absorbed directly into the bloodstream.
  - Useful for infants, patients who cannot take oral preparations, and patients with nausea and vomiting.
  - Stored in cool place so they do not melt.

Percutaneous Administration

- With these routes, medications are absorbed through the skin or the mucous membranes.
- Most produce a local action, but some produce a systemic action.
- Drugs include topical applications, instillations, and inhalations, ointments, creams, powders, lotions, and transdermal patches.
- Absorption is rapid but of short duration.

Percutaneous Administration

- **Ointments**
  - An oil-based semisolid medication; may be applied to the skin or a mucous membrane.
- **Creams**
  - Semisolid, nongreasy emulsions that contain medication for external application.
- **Lotions**
  - Aqueous preparations that are used as soothing agents that relieve pruritus, protect the skin, cleanse the skin, or act as astringents.
**Percutaneous Administration**

- Transdermal Patches (Topical Disk)
  - Adhesive-backed medicated patches applied to the skin provide sustained, continuous release of medication over several hours or days.

- Eyedrops and Eye Ointments
  - Care should be taken to keep all ophthalmic preparations sterile by not touching the dropper or the tube to the eye.

- Eardrops
  - Containers of solutions to be used as eardrops will be labeled “otic.” They must be at room temperature when applied.

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**Figure 23-3**

A variety of medications are available as transdermal patches.

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**Nosedrops**
- Nosedrops are for individual use only.

**Nasal Sprays**
- Sprays absorbed quickly; less medication is used and wasted when administered in this manner.

**Inhalation**
- Drugs may be absorbed through the mucous membranes of the respiratory tract.
- Inhalation produces a relatively limited effect or a systemic effect.
- This method is actively used by respiratory therapy and anesthesiologists.
**Percutaneous Administration**

- **Sublingual Administration**
  - Drug is administered by placing it beneath the tongue until it dissolves.
  - Drug may be a tablet or liquid squeezed out of a capsule.
  - It is rapidly absorbed into the bloodstream.

- **Buccal Administration**
  - A tablet is placed between the cheek and teeth, or between the cheek and the gums.
  - Absorption into the capillaries of the mucous membranes of the cheek gives rapid onset of the drug’s active ingredient.

**Parenteral Administration**

- **Equipment**
  - **Syringes**
    - Syringe consists of a barrel, a plunger, and a tip.
    - Outside of the barrel is calibrated in milliliters, minims, insulin units, and heparin units.
  - **Types**
    - Tuberculin syringe
    - Insulin syringe
    - Three-milliliter syringe
    - Safety-Lok syringes
    - Disposable injection units

**Figure 23-4**

- Parts of a syringe:
  - Plunger
  - Barrel
  - Tip
  - Measure dose here
  - Avoid touching

Figure 23-5

Tuberculin syringe calibration.

(From Clayton, B.D., Stock, Y.N. [2004]. Basic pharmacology for nurses. [13th ed.]. St. Louis: Mosby.)

Figure 23-6

Calibration of U100 insulin syringe.

(From Clayton, B.D., Stock, Y.N. [2004]. Basic pharmacology for nurses. [13th ed.]. St. Louis: Mosby.)

Figure 23-7

Reading the calibrations of a 3 mL syringe.

(From Clayton, B.D., Stock, Y.N. [2004]. Basic pharmacology for nurses. [13th ed.]. St. Louis: Mosby.)
Figure 23-9

Safety-Glide syringe.

Figure 23-11

Parts of a needle.

Percutaneous Administration

- Equipment (continued)
  - Needles
    - Parts are the hub, shaft, and beveled tip.
    - Opening at the needle’s beveled tip is the lumen.
    - Size of the diameter of the inside of the needle’s shaft determines the gauge of the needle; the smaller the gauge, the larger is the diameter.
    - Needle gauge selection is based on the viscosity of the medication.
Percutaneous Administration

- Equipment (continued)
  - Needle Length
    - Selected based on the depth of the tissue into which the medication is to be injected.
    - Intradermal: 3/8 to 5/8 inch
    - Subcutaneous: 5/8 to 1/2 inch
    - Intramuscular: 1 to 1 1/2 inch
  - Intravenous Needles
    - Butterfly (scalp needle)
    - Over-the-needle catheter (Angiocath, Jelco)

Figure 23-12

- Needle length and gauge.

Percutaneous Administration

- Needleless Devices
  - Devices are designed with a sheath or guard that covers the needle after it is withdrawn from the skin.
  - Intravenous catheters have been designed with blunt-edged cannulas, valves, or needle guards to minimize injuries.
  - IV tubing with recessed and shielded needle connectors have been designed, further reducing needlesticks.
Percutaneous Administration

- **Intramuscular Injections**
  - Involves inserting a needle into the muscle tissue to administer medication
  - **Site Selection**
    - Gluteal sites
    - Vastus lateralis muscle
    - Rectus femoris muscle
  - Deltoid muscle
  - **Z-track Method**
    - Used to inject medications that are irritating to the tissues

**Figure 23-15, C**

Locating IM injection for ventrogluteal site.


**Figure 23-16, C & D**

Locating right dorsogluteal site. Giving IM injection in left dorsogluteal site.

(C, D, from Elkin, M.K., Perry, A.G., Potter, P.A. *Nursing interventions and clinical skills* [3rd ed.]. St. Louis, Mosby.)
Giving IM injection in vastus lateralis site on adult.

Rectus femoris muscle: A. Child/infant; B. Adult.

Giving IM injection in deltoid site.
Figure 23-20


Percutaneous Administration

- Intradermal Injections
  - Introduction of a hypodermic needle into the dermis for the purpose of instilling a substance such as a serum, vaccine, or skin test agent
  - Not aspirated
  - Small volumes (0.1 ml) injected to form a small bubblelike wheal just under the skin
  - Used for allergy sensitivity tests, TB screening, and local anesthetics
  - A tuberculin syringe used with a 25-gauge, 3/8- to 5/8-inch needle

Figure 23-21

Angles of insertion for intramuscular (90°), subcutaneous (45°), and intradermal (15°) injections.
Percutaneous Administration

- **Subcutaneous Injections**
  - Injections made into the loose connective tissue between the dermis and the muscle layer
  - Drug absorption slower than with IM injections
  - Given at a 45-degree angle if the patient is thin or at a 90-degree angle if the patient has ample subcutaneous tissue
  - Usual needle length is 1/2 to 5/8 inch and 25 gauge
  - Used to administer insulin and heparin

**Figure 23-22**

Subcutaneous injection. Angle and needle length depend on the thickness of skinfold.

(From Elkin, M.K., Perry, A.G., Potter, P.A. [2004]. Nursing interventions and clinical skills [3rd ed.]. St. Louis: Mosby.)

Percutaneous Administration

- **Intravenous Therapy**
  - Provide fluid and electrolyte maintenance, restoration, and replacement
  - Administer medication and nutritional feedings
  - Administer blood and blood products
  - Administer chemotherapy to cancer patients
  - Administer patient-controlled analgesics
  - Keep a vein open for quick access
Stress

- I can’t take it anymore
- It’s time to go for a med break
- How am I going to deliver it
- Just do it

Percutaneous Administration

- Methods of Intravenous Administration

  - IV push
  - Intermittent venous access device
  - Intermittent infusion (or piggyback)
  - Continuous infusion
  - Electronic pumps and controllers
  - Patient-controlled analgesia
  - Volumetric chambers

Figure 23-24

(PGA infusion pump.)

The end

- Psychiatric Technician students do not complain or cry, except these two