INJECTIONS

Parenteral—other than through alimentary tract
1. Intradermally
2. Subcutaneously
3. Intramuscularly
4. Intravenously

Absorbed more quickly than oral and irretrievable once injected
- Must be careful and accurate
- Invasive procedure so must use sterile or aseptic technique

Equipment

Syringes:
3 Parts:
1. Tip—connects with needle
2. Barrel—outside part on which scale printed
3. Plunger—fits inside barrel
   - Tip, inside of barrel, shaft of plunger, and shaft and tip of needle must remain sterile

Hypodermic: 2, 2.5, 3 mL size
- Scale in mL (normally used)
- Minum scale

Insulin: scale designed especially for insulin
- 100 unit calibrated
- low-dose insulin syringe—30 or 50 units

Tuberculin: 1mL calibrated in tenths and hundredths
- minum scale on other side

Other syringes: (5, 10, 20, 50 mL) also available

Leur-Lok—has threads requiring user to twist needle in place, needle less likely to come off accidentally
Non Leur-Lok—often used for irrigating

Pre-filled unit-dose:
1. Pre-filled syringes ready for use
2. Pre-filled cartridges and needles
   - Tubex or Carpuject
   - Often over filled so waste excess medication
Needles
Hub—fits into syringe
Cannula or shaft—attached to hub
Bevel—slanted part at tip
1. Slant or length of bevel-
   • Longer-sharper
   • Short- intradermal, intravenous
2. Length of shaft-
   Approximately ½ to 2”
   Choice based on client’s muscle development, weight, and type of injection
3. Gauge—diameter of shaft, 18 to 28
   Larger the number-smaller the diameter
   Subcutaneous- 24 to 26 gauge, 3/8 to 5/8” long
   Obese may require 1” needle
   Intramuscular- 20 to 22 gauge 1 to 1½ “ long

Preventing Needle Stick Injuries
Techniques pg. 430, Box 17-1, Avoiding Puncture Injuries

Preparing Injectable Medications
Ampules and Vials
• Ampule—glass container holding single does, distinctive shape with constricted neck
  o Usually 1 to 10 mL
  o Break at mark on neck
  o Must use filter needle or filter straw
• Vial—glass bottle with rubber stopper
  o Can be single or multi-dose
  o Must be pierced with needle or needle-less system
  o Air must be injected before med withdrawn
• Powder in vials
  o Reconstitute with solvent or diluent
  o Sterile water or saline used as diluent
• Filter needles should be used with both ampules and vials (especially ampules) to eliminate risk of glass or rubber particles

Using Medication Ampules (Highlights)
3 Checks
1. When med is taken from cart, drawer, etc.
2. Before withdrawing med from ampule
3. After withdrawing med from ampule
Prepare med for withdrawal from ampule by flicking with fingernail
- This removes med from neck
- Use sterile gauze to break, pull top towards nurse so glass flies away
- Top of ampule in sharps container
- Place ampule on flat surface
- Remove needle with cap and replace with filter needle
- Insert needle to ampule without touching rim
- With single dose—tip slightly to get all medication
- Replace filter needle with regular needle

Using Medication Vials (Highlights)
- Rotate vial to mix aqueous suspensions
- Use filter needle of available
- Draw up equal amount of air as med to be withdrawn and inject into vial with needle above surface of medication
- Withdraw med into syringe, re-inject air back into vial and remove air bubbles
- Replace filter needle if used

Mixing Medications in One Syringe
Always check compatibility—contact pharmacist or use compatibility chart
1. Draw air into syringe to total amount of both meds
2. Inject air (equal to med to be given) into vial A
3. Inject remainder of air into vial B
4. Leaving needle in vial B—aspirate amount of medication needed
5. Change needle (this will not be possible) when using insulin syringe as unable to detach needle
6. Withdraw med from vial A—only amount ordered

Insulin—NPH insulin vial A, Regular Vial B
See Techniques photo on page 437

Intradermal Injections
Into the dermal layer just below epidermis
Use small amount—often 0.1 mL
Often used for allergy testing, tuberculin screening
Sites: inner lower arm, upper chest, back beneath scapula

Implementation (Highlights)
- Can be absorbed slowly into general circulation and bleb gradually disappears
- Can remain in injection area and body may produce redness and induration (hardening) and will be interpreted at particular time
  - TB test
- Clean skin at site with firm, circular motion starting in center moving outward
- Insert syringe with bevel up at 15° angle or less
Subcutaneous Injections

- Kinds of drugs: vaccines, preoperative medications, narcotics, insulin, heparin
- Sites: outer aspect of upper arm and anterior aspect of thighs
- Alternate sites: abdomen, scapular areas of upper back, upper ventrogluteal and dorsogluteal areas
- Dose: 0.5 to 1.0 mL
- Syringe: 2 mL for general use
  - Insulin syringe for insulin
  - TB syringe for heparin
  - 25 gauge, 5/8” needle for average adults
    - Insert at 45° angle or 3/8” at 90° angle
  - 1/2 width of pinched tissue at site to determine needle length
  - 45° angle if 1” grasped, 90° angle if 2” grasped
- Insulin: may use micro fine needles
  - 30 gauge with 5/16” length
  - Rotate site within anatomical region
  - Absorption rate different when move from one part of body to another

Implementation Subcutaneous Injections (Highlights)

- Select site free of tenderness, hardness, swelling, scarring, itching, burning, or localized inflammation
- Wear clean gloves
- After needle penetrates tissue—aspire if blood appears, withdraw needle and discard, begin again
- Don’t aspirate when giving heparin
- Don’t aspirate when giving insulin
- Don’t massage when giving heparin
- Heparin given at abdominal site

Intramuscular Injections

- Absorbed more quickly that in subcutaneous.
- Tolerate up to 3 mL medication in well-developed muscles.
  - 1-2 mL with less developed muscles.
  - 0.5 mL in deltoid.
- Standard needle 1 1/2 inch, 21 or 22 gauge.
- Factors determining size and length of needle.
  - Muscle
  - Type of medication solution
  - Amount of adipose tissue
• Age of client
  • Deltoid—1 inch, 23 or 25 gauge
  • Viscous solutions—20 gauge
  • Very obese 1½ to 2 inches

Ventrogluteal site
  • Gluteus medius
  • Preferred site
    o No large nerves or blood vessels
    o Greatest thickness of gluteal muscle
    o Sealed off by bone
    o Less fat than buttock
    o Side lying position but can be prone or supine

Vastus Lateralis site
  • Middle third of muscle
  • Back-lying or sitting position

Dorsogluteal
  • Must use great care to avoid striking sciatic nerve, major blood vessel, or bone
  • Assume prone position, toes pointed inward or side-lying with upper knee in front of lower leg

Deltoid site
  • Not often used, area small and close to radial nerve and radial artery
  • Maximum—1 mL to be administered
  • Landmark—place four fingers across muscle with first on acromion process, top of axilla lower border

Rectus Femoris
  • Used only occasionally

Technique (Highlights)
  • Change needle if possible with drawing up medication as can irritate subcutaneous tissue
  • Inject medication slowly, 10 sec for 1 mL