**BASIC IV**

Intravenous infusion - instillation into vein of fluid, electrolytes, medications, blood, or nutrient substances

Prescribed to:

1. Supply parenteral fluid, electrolytes, or calories when client unable to take in by mouth
2. Provide water-soluble vitamins and medications
3. Establish line for emergency medications

**Common Types Solutions**

1. Nutrient - carbohydrate and water (dextrose or glucose) for fluid requirements and energy. 
   1 liter 5% dextrose provides 170 calories

2. Electrolytes - cations and anions 
   normal saline - 0.9% sodium chloride solution
   lactated Ringers - sodium, chloride, potassium, calcium, and lactate

3. Blood volume expanders - increase volume of blood or plasma (severe blood loss, burns) 
   dextran, plasma, human serum albumin
   Isotonic (similar concentration of solutes as plasma) - normal saline
   Hypotonic (less concentration of solutes than plasma) - 0.45% sodium chloride, provides extra hydration.
   Hypertonic (greater concentration of solutes than plasma) - 5% Dextrose in lactated Ringers, can draw fluid out of cells and interstitial spaces into vascular system

**Peripheral Venipuncture Sites**

- Varies with client’s age, infusion time, type of solution, condition of veins
- Forearm appropriate when rapid infusion, those that are hypertonic, highly acidic, or alkaline, or contain irritation medications.
- Hands can also be used - metacarpal, basilic, and cephalic veins.
- Antecubital basilic and median cubital 
  convenient but limit mobility of elbow which needs to be splinted.
- Long-term or caustic medications
  Central Venous Catheter
  Implanted Venous Access Device
Intravenous Equipment

- Solution - various sizes
  - Supplied in plastic bags, some medications in glass bottles

- Administration Sets (tubing)
  - Insertion spike with protective cap, drip chamber, roller valve or screw clamp, tubing, injection ports, and connector to IV catheter.

- Drip chamber
  - Macrodrool 10 to 20 drops per mL.
  - Microdrip 60 drops per mL.

- Injection ports to administer medications or secondary infusions.
  - Access with needle or needleless system.

- Secondary sets - tandem or piggyback
  - Volume controlled administration set - burretrol

- Needles and catheters
  - Butterfly (wing tipped)-needle with plastic flaps.
  - Needle length 2 to 1 1/4, 25 to 17 gauge

- Catheters or angiocatheters - some catheters fit over needle or stylet, some on inside
  - Generally needle or stylet withdrawn and catheter left in place.
  - 20 to 22 gauge most common for adults.

- IV filters – used to remove air and particulate

Problems:
1. Clogging
2. Binding of some drugs

- Intermittent infusion lock
  - Attach injection cap to IV catheter. May have extension tubing attached.
  - Heparin lock or saline lock - flushed regularly to keep blood from coagulating and occluding catheter.

Establishing Intravenous Infusion

- In this unit you will not be establishing an IV. You will need to know how to assist the nurse who is, as well as how to assist your client
- Check for infiltration or inflammation - must remove IV catheter and restart at different site
- Client’s clothing and gown should be removable over IV apparatus - place client in an IV gown that opens at the shoulder
- Label is placed on IV bag upside down if med has been added
- Timing strip added to solution bag to indicate anticipated level at hourly intervals
- Solution container should be positioned about 3 feet over client’s head
- Drip chamber no more than half full

**Regulating IV Flow Rates**

See Basic IV worksheet
- client at risk for hypovolemia or hypervolemia if rate incorrectly calculated
- Each type of tubing has particular drop or drip factor, printed on tubing package
  - Macrodrip - 10, 12, 15, or 20 drops = 1 mL
  - Microdri - 60 drops = 1 mL
- **Calculate mL/hour or drops/min**
  - Keep vein open (KVO) or to keep open (TKO)
- Rules - if no agency policy, must notify physician for further direction

**Milliliters Per Hour (Used with IV Pumps)**

- Check IV every hour to be sure IV flowing at correct rate
- Use time tape - never write directly on bag as ink from felt-tip pen can leak through plastic

\[
\text{mL} = \frac{\text{volume to be infused}}{\text{hr}} \times \text{time infusion should run}
\]

**Drops Per Minute (Used with Gravity Drip)**

- Must use drip or drop factor in calculations

\[
\text{gtts.} = \frac{(\text{drop factor}) \text{ gtts}}{\text{min}} \times \frac{(\text{volume}) \text{ mL}}{\text{ mL}} \times \frac{1 \text{ hr}}{\text{hr}} \times \frac{60 \text{ min}}{60 \text{ min}}
\]

**Using Pump or Controller**

- Make sure client clothing or gown can be removed over IV
- Infusion controller (See Techniques pgs. 480-481)
  - Position IV pole so drip chamber approximately 30 inches above venipuncture site
  - Drip chamber should be filled 1/3 to 1/2
  - All air should be expelled from tubing
  - IV drop sensor (electronic eye) attached to drip chamber above fluid level
- Set alarm for volume 50 mL less than adequate time to change container (some nurses set at hourly rate to remind nurse to check)
- Count drops for 15 seconds and multiply by 4 to verify that controller is accurate
- Check every hour
- If not infusing at correct rate, check that:
  1. Time tape is accurate
  2. Rate/volume setting accurate
  3. Drip chamber correctly filled
  4. IV tubing clamp open
  5. Container has solution
  6. Sensor correctly placed
  7. IV container correctly placed
  8. Tubing not kinked or pinched
  9. No infiltration, clot at insertion site

- Infusion Pump
  - Doesn’t depend on gravity, place at eye level for convenience
  - Use correct tubing

**Maintaining Infusion**

- Routine changing of catheter site and tubing every 72 hours or per agency policy
- Dressing changed when soiled, wet, or catheter is dislodged

**Correct Solution?**
- If incorrect slow to keep open rate and change to correct solution
- Med error = incident report

**Correct Rate?**
- Check hourly
- Read by pulling edges of bag apart
- Solution approx. 3 ft. above venipuncture site

**Too Fast?**
- Slow so will finish at planned time or (depending on agency policy)
- Adjust for signs of fluid overload (hypervolemia); dyspnea (rapid, labored breathing); cough; crackles/rales; tachycardia; bounding pulses

**Too Slow?**
- Adjust to prescribed rate or (depending on agency policy)
- Adjust by additional 10%
- Problems include insufficient fluid intake, electrolytes, or medications

**Patency of IV tubing and needle**
- Drip chamber half full
- Inspect tubing for pinches or kinks
- Check tubing position
- Check for return flow of blood
- Check level placement
- Check leakage

Inspect IV site
- Infiltration
- Phlebitis
- Oozing or bleeding

**Discontinuing Infusions (Highlights)**

- Clamp tubing
- Loosen tape but support needle or catheter
- Apply clean gloves
- Pull straight out
- Apply pressure with sterile gauze 2-3 mins
- Elevate above heart
- Check intactness of catheter
- **If broken piece palpable apply tourniquet proximal to piece FIRST**
- If broken report immediately to charge nurse or physician