Infusion Therapy – Intravenous Therapy Administration

SECTION: 25.24

Strength of Evidence Level: 3

PURPOSE:
To provide a peripheral venous route for the administration of fluids and/or medications that will maintain or replace body stores of fluids, provide nutrition and treat illnesses.

CONSIDERATIONS:
1. Prior to instituting therapy, the nurse will:
   a. Review the physician's order for the type of solution, amount/dosage to be infused, rate of infusion, frequency, route and duration.
   b. Obtain patient's allergy history.
   c. Obtain a signed informed consent form.
      [Note: This must be done before beginning therapy.]
   d. Instruct the patient or caregiver regarding storage and handling of supplies and patient care required in the absence of the nurse.
   e. Review the actions, usual dosage, indications for use, side effects and incompatibilities of the solution or medication to be administered.
      [Note: For the purpose of consistency, all plastic catheters and needles will be referred to as cannulas and special techniques noted for using plastic intravenous catheters and stainless steel intravenous (IV) needles.]
2. In selecting equipment, consider the following:
   a. Duration and purpose of therapy:
      (1) Steel needles (butterfly) may be used for short-term or one-time dosing of non-irritating infusates given with the nurse in attendance.
      (2) Plastic catheters are indicated in long-term continuous or intermittent therapy and when giving potentially irritating infusates.
      Description: A plastic/silicone catheter inserted over the needle. The needle is removed once the catheter is in the vein.
   b. Cannula length and gauge:
      (1) The size of the cannula lumen must be less than the lumen of the vein. Choose the smallest gauge that is adequate for the prescribed rate and type of infusate (22–24 gauge is recommended).
      (2) The length of the cannula may be directly related to infection and/or embolism formation; therefore, the shortest cannula that will accommodate the therapy is required. Length should not be more than 3/4 to 1 1/4 inch for a distal, peripheral site.
3. In selecting a vein, consider the following:
   a. Location:
      (1) Use most distal, superficial vein first.
      (2) In elderly patients, veins of the hands may be unsuitable due to the lack of supporting tissue.
      (3) A large vein should be used for long-term therapy and hypertonic or potentially irritating drugs or solutions, e.g., peripheral parenteral nutrition or hydration fluids with potassium.
   b. Condition of veins:
      (1) Select a healthy, resilient vein above areas of previous infiltration, bruising or inflammation.
      (2) Vein should feel round, firm, elastic and engorged, not hardened.
4. Techniques to distend the vein include:
   a. Apply a tourniquet 4-6 inches above selected site.
   b. Request patient to open and close fist intermittently. This will make the vein more prominent.
   c. Place extremity in a dependent position.
   d. Massage in the direction of venous flow.
   e. Gently tap over the intended site.
   f. Apply heat with heating pad or warm, moist towel.
5. The bevel of the cannula needle should be up when attempting to access the vein to reduce the risk of piercing the vein's back wall.
6. All tubing must be primed to remove the air prior to attaching to the patient's cannula.
7. A short microbore extension set should be attached to all peripheral cannulas.
8. Minimal amounts of tape should be used in securing the cannula hub to the patient's skin, leaving puncture site and junction of tubing to cannula free.
9. IV tubing must be changed according to the national standards listed below:
   a. Primary continuous - every 72 hours.
   b. Secondary continuous - every 72 hours.
   c. Primary intermittent - every 24 hours.
   d. Secondary intermittent - every 24 hours.
   e. Blood products tubing - after each unit.
   f. TPN tubing - every 24 hours.
   g. Fat emulsion (LIPIDS) – every 24 hours.
10. Luer-lock connections should be used whenever possible; if not, tubing connections should be taped and a tab left for ease of removal.
11. When administering intravenous therapy in the home, healthcare workers should adhere to Standard Precautions. (See Infection Control: Standard Precautions.)
12. The use of arm boards to immobilize an extremity is allowed to prevent potential infiltration or phlebitis in an uncooperative, disoriented or elderly patient or...
child. The arm board should be removed, and the patient’s extremity circulatory status should be assessed at established intervals.

13. After two unsuccessful attempts at cannula placement, the nurse should consider requesting assistance from her/his supervisor/manager.

14. Excess hair at the intended site should be clipped, NOT shaved, because of the potential for micro abrasions, which increase the risk of infection.

15. Use at least two patient identifiers prior to administering medication.

**EQUIPMENT:**

- Gloves
- Tourniquet
- Alcohol applicator (wipe/swab/disk/ampule)
- Antimicrobial applicator (wipe/swab/disk/ampule)
- Cannula
- IV solution
- IV tubing
- 0.22-micron filter
- 3-5 mL syringe with normal saline
- Small extension set, e.g., 5-inch microbore
- 2x2 gauze sponges, sterile
- Transparent permanent adhesive dressing
- Antimicrobial ointment (optional)
- Tape
- IV pole
- Arm board (optional)
- Puncture-proof container
- Impervious trash bag
- Disposable apron (optional)
- Protective eye wear (optional)

**PROCEDURE:**

1. Adhere to Standard Precautions.
2. Explain procedure and purpose to patient/caregiver.
3. Assemble the equipment on a clean surface close to the patient.
4. Question patient regarding allergies to adhesive tape and iodine.
5. Place patient in a comfortable position, ensuring that site is accessible and stable.
6. Ensure adequate lighting.
7. Prepare equipment.
   a. Check patient’s name and expiration date on fluid container.
   b. Check fluid container for prescribed solution, leakage, particulate matter and discoloration.
   c. Add medication, if necessary. Label the container with name of additive, date, time and nurse’s initials.
   d. Connect IV tubing with filter to the fluid container and flush air from tubing. Fill drip chamber halfway. Maintain sterility of free end of tubing.
   e. Hang solution container a minimum of 3 feet above insertion site.
   f. Prime small extension set to be added to IV catheter.
8. Assess hand or arm for appropriate venipuncture sites.
9. Apply tourniquet.
10. Clean the skin.
   a. If the site is excessively hairy, clipping is recommended.
   b. Clean skin with an alcohol applicator. Apply in a circular motion starting at the intended site and working outward using friction. Allow to air dry. If using a 2% chlorhexidine solution, use a back and forth scrubbing motion. Allow to air dry. Only one application is necessary. No alcohol prep is required.
   c. Repeat with antimicrobial applicator. Allow to air dry. DO NOT bot. DO NOT retouch cleansed area due to contamination of site.
11. Anchor the vein by holding the skin taut below the selected site.
12. Insert the cannula at a 30-45 degree angle beside the vein.
13. When skin is pierced, lower the angle of the cannula almost parallel to the skin. Gently apply pressure and enter the vein.
14. When backflow of blood is evident, advance the cannula forward keeping the inner needle (stylet) stationary until the hub is flush against the insertion site.
15. Release the tourniquet. Apply pressure above site to occlude blood flow. Remove stylet and connect extension set. Flush line with 3-5 mL of normal saline. Observe site for swelling or discomfort.
16. Connect IV tubing, securing to extension set. Secure tubing connections with tape, leaving a tab for removal if luer lock connection is not used.
17. Start infusion slowly while observing site.
18. Secure the cannula hub to the patient with tape. DO NOT cover the insertion site and the hub/tubing connection.
19. Cover with transparent dressing.
20. Secure IV tubing with tape to prevent tension on the insertion site.
21. Use an arm board, if indicated.
22. If using an infusion pump to regulate the drip rate, refer to the manufacturer’s instructions on the package.
23. Regulate the drip rate if infusing by gravity and apply time tape to solution container.
   a. Formula for computing drops/minute is: Rate (mL/hr) x Drop Factor of tubing (gtts/mL / 60 (min/hr)) = gtts/min.
b. The formula to determine drops per minute is:
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gtts/mL \text{ of infusion set} \times \text{hourly volume} = \gtts/min.
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24. If a micro drip set is used, the number of drops/minute equals the amount of solution/hour. This type of set is recommended since calculation is simple to remember and the patient/caregiver can learn to regulate the flow easier.
25. Discard soiled supplies in appropriate containers.

REMOVAL:
1. Adhere to Standard Precautions.
2. Stop IV flow by closing clamp or turning off pump.
3. Remove dressing from insertion site and inspect skin.
4. Place sterile gauze over needle at insertion site. Withdraw cannula slowly. Cannula should be removed at an angle nearly flush with the skin to prevent injury to the wall of the vein. Apply pressure to puncture site with gauze for 2 to 3 minutes. Observe to see if catheter is intact.
   If catheter is not intact:
   a. Notify physician immediately. Physician may request that patient be transported to nearest emergency department for evaluation.
   b. Place patient on strict bed rest.
   c. Monitor patient closely for signs and symptoms of embolism.
5. Apply gauze sponge or self-adhesive bandage and elevate extremity.
6. Discard soiled supplies in appropriate containers.

AFTER CARE:
1. Document in patient's record:
   a. Medication/solution administered, dose, time, rate, site and route.
   b. Patient's response to procedure, side effects and management.
   c. Type and appearance of venous access site.
   d. Instructions given to patient/caregiver.
   e. Communication with physician, if appropriate.
2. Write date of insertion, gauge, length of catheter and initials on dressing tape.
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