

Procedure #1: Starting an Intravenous Infusion

Before preparing the infusion, the nurse first verifies the primary care provider's order indicating the type of solution, the amount to be administered, the rate of flow or time over which the infusion is to be completed, and any client allergies (e.g., to tape or povidone-iodine)

PURPOSES

- To supply fluid when clients are unable to take in an adequate volume of fluids by mouth
- To provide salts and other electrolytes needed to maintain electrolyte balance
- To provide glucose (dextrose), the main fuel for metabolism
- To provide water-soluble vitamins and medications
- To establish a lifeline for rapidly needed medications

ASSESSMENT

- Vital signs (pulse, respiratory rate, and BP) for baseline data.
- Allergy to latex (e.g., tourniquet), tape, or iodine.
- Bleeding tendencies.
- Disease or injury to extremities.
- Status of veins to determine appropriate venipuncture site.
- Avoid sites that have been used recently.
- The agency policy about clipping hair in the area before a venipuncture. Shaving is not recommended because of the possibility of nicking the skin and subsequent infection.

Equipment

- Substitute appropriate supplies if the client has tape, antiseptic, or latex allergies
- Infusion set
- Sterile parenteral solution
- IV pole
- Nonallergenic tape
- Clean gloves
- Tourniquet
- Antiseptic swabs such as 10% povidone-iodine or 2% chlorhexidine gluconate with alcohol or 70% isopropyl alcohol. Chlorhexidine is becoming
- IV catheter (Choose an IV catheter of the appropriate type and size based on the size of the vein and the purpose of the IV. A #20- to #22-gauge catheter is indicated for most adults. Always have an extra catheter and ones of different sizes available.)
- Sterile gauze dressing or transparent semipermeable membrane (TSM) dressing (preferred)
- Stabilization device
- Splint, if required
- Towel or bed protector
- Local anesthetic (optional and per agency policy)

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the standard of practice and is the antiseptic preferred (Phillips & Gorski, 2014, p. 338).

- Electronic infusion device or pump (The nurse decides what device is needed as appropriate to the client's condition.)

Preparation

- 1- If possible, select a time to perform the venipuncture that is convenient for the client. Unless initiating IV therapy is urgent, provide any scheduled care before establishing the infusion to minimize excessive movement of the affected limb.
- 2- Make sure that the client's clothing or gown can be removed over the IV apparatus if necessary. Many agencies provide special gowns that open over the shoulder and down the sleeve for easy removal
- 3- Visitors or family members may be asked to leave the room if desired by the nurse or the client

Performance

1. Prior to performing the procedure, introduce self and verify the client's identity using agency protocol. Explain to the client what you are going to do, why it is necessary, and how he or she can participate. Venipuncture can cause discomfort for a few seconds, but there should be no ongoing pain after insertion. If possible, explain how long the IV will need to remain in place and how it will be used.
2. Perform hand hygiene and observe other appropriate infection prevention procedures.
3. Position the client appropriately.
 - Assist the client to a comfortable position, either sitting or lying.Expose the limb to be used but provide for client privacy.
(Note: Steps 4 through 10 may be performed outside of the client's room and then the system transported to the client's bedside.)
4. Apply a medication label to the solution container if a medication is added.
 - In many agencies, medications are added and labels are applied to IV containers in the pharmacy; if they

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are not, apply the label upside down on the container.

5. Open and prepare the infusion set.

- Remove tubing from the package and straighten it out.
- Slide the tubing clamp along the tubing until it is just below the drip chamber to facilitate its access.
- Close the clamp.
- Leave the ends of the tubing covered with the plastic caps until the infusion is started.

6. Spike the solution container.

- Expose the insertion site of the bag or bottle by removing the protective cover.
- Remove the cap from the spike and insert the spike into the insertion site of the bag or bottle.



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7. Hang the solution container on the pole.

- Adjust the pole so that the container is suspended about 1 m (3 ft) above the client's head.

8. Partially fill the drip chamber with solution.

- Squeeze the chamber gently until it is half full of solution. **2**



9. Prime the tubing as described below. The term prime means "to make ready" but in common use refers to flushing the tubing to remove air.

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- Remove the protective cap and hold the tubing over a container. Maintain the sterility of the end of the tubing and the cap.
- Release the clamp and let the fluid run through the tubing until all bubbles are removed. Tap the tubing if necessary with your fingers to help the bubbles move.
- Reclamp the tubing and replace the tubing cap, maintaining sterile technique.
- If an infusion control pump, electronic device, or controller is being used, follow the manufacturer's directions for inserting the tubing and setting the infusion rate.

10. Perform hand hygiene again just prior to client contact.

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11. Select the venipuncture site.

- Use the client's nondominant arm, unless contraindicated (e.g., mastectomy, fistula for dialysis). Identify possible venipuncture sites by looking for veins that are relatively straight. The vein should be palpable, but may not be visible, especially in clients with dark skin. Consider the catheter length; look for a site sufficiently distal to the wrist or elbow such that the tip of the catheter will not be at a point of flexion.

- Check agency protocol about shaving if the site is very hairy. Shaving is not recommended.

12. Dilate the vein.

- Place the extremity in a dependent position (lower than the client's heart).

- Apply a tourniquet firmly 15 to 20 cm (6 to 8 in.) above the venipuncture site. **3** Explain that the tourniquet will feel tight.

- Use the tourniquet on only one client. This avoids cross contamination to other clients. Be sure to ask if the client has a latex allergy.

- For older adults with fragile skin, instead of applying a tourniquet, place the arm in a dependent position to allow the veins to engorge.

- If the vein is not sufficiently dilated:

- a. Massage or stroke the vein distal to the site and in the direction of venous flow toward the heart.



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- b. Encourage the client to clench and unclench the fist.
veins, forcing blood along the veins and distending them.
 - c. Lightly tap the vein with your fingertips.
 - If the preceding steps fail to distend the vein so that it is palpable, remove the tourniquet and wrap the extremity in a warm towel for 10 to 15 minutes.
13. Minimize insertion pain as much as possible.
- Although the pain of insertion should be brief, prevention can and should be offered. Transdermal analgesic creams (e.g., EMLA, Synera) may be used, depending on policy. Allow at least 30 to 60 minutes for the topical analgesic to take effect.
 - If desired and permitted by policy, inject 0.3 mL of 1% lidocaine (without epinephrine) intradermally over the site where you plan to insert the IV catheter. (Be sure to first apply gloves and clean the skin site as described in step 14.) Allow 5 to 10 seconds for the anesthetic to take effect.
14. Apply clean gloves and clean the venipuncture site.
- Clean the skin at the site of entry with a topical antiseptic swab (e.g., 2% chlorhexidine, or alcohol). Some institutions may use an anti-infective solution such as povidone-iodine (check agency protocol). Check for allergies to iodine or shellfish before cleansing skin with Betadine or iodine

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products.

- When using chlorhexidine solution (preferred), use a backand-forth motion for a minimum of 30 seconds to scrub the insertion site and surrounding area. Allow the site to completely air dry before inserting the catheter. Do not fan, blow on, or wipe the skin.

- When using povidone-iodine, apply using swab sticks in a concentric circle beginning at the catheter insertion site and moving outward. The iodine should be in contact with the

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continued

skin for 2 minutes or longer to completely dry for adequate antisepsis.

15. Insert the catheter and initiate the infusion.

- Remove the catheter assembly from its sterile packaging. Review instructions for using the catheter because a variety of needle safety devices are manufactured. Remove the cover of the needle (stylet).

- Use the nondominant hand to pull the skin taut below the entry site.

- Holding the over-the-needle catheter at a 15- to 30-degree angle with needle (stylet) bevel up, insert the catheter through the skin and into the vein. A sudden lack of resistance is felt as the needle (stylet) enters the vein. Use a slow steady insertion technique and avoid jabbing or stabbing motions.



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- Once blood appears in the lumen or clear “flashback” chamber of the needle, lower the angle of the catheter until it is almost parallel with the skin, and advance the needle (stylet) and catheter approximately 0.5 to 1 cm (about 1/4 in.) farther. ④ Holding the needle assembly steady, advance the catheter until the hub is at the venipuncture site. The exact technique depends on the type of device used. Rationale: The catheter is advanced to ensure that it, and not just the stylet, is in the vein.
- If there is no blood return, try redirecting the catheter assembly again toward the vein. If the stylet has been withdrawn from the catheter even a small distance, or the catheter tip has been pulled out of the skin, the catheter must be discarded and a new one used. A catheter that has been removed from the skin is considered contaminated and cannot be reused.
- If blood begins to flow out of the vein into the tissues as the catheter is inserted, creating a hematoma, the insertion has not been successful. This is sometimes referred to as a blown vein. Immediately release the tourniquet and remove the catheter, applying pressure over the insertion site with dry gauze. Attempt the venipuncture in another site, in the opposite arm if possible. Rationale: Placing the tourniquet back on the same arm above the unsuccessful site may

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cause it to bleed. Placing the IV below the unsuccessful site could result in infusing fluid into the already punctured vein, causing it to leak

- Release the tourniquet.
- Put pressure on the vein proximal to the catheter to eliminate or reduce blood oozing out of the catheter. Stabilize the hub with thumb and index finger of the nondominant hand.
- Remove the protective cap from the distal end of the tubing and hold it ready to attach to the catheter, maintaining the sterility of the end.
- Stabilize the catheter hub and apply pressure distal to the catheter with your finger. **5**

Rationale: This prevents excessive blood flow through the catheter.

- Carefully remove the stylet, engage the needle safety device if it does not engage automatically, and attach the end of the infusion tubing to the catheter hub. Place the stylet directly into a sharps container. If this is not within reach, place the stylet into its original package and dispose in a sharps container as soon as possible.

- Initiate the infusion or flush the catheter with sterile normal saline. **6** Rationale: Blood must be removed from the catheter lumen and tubing immediately. Otherwise, the blood will clot inside the lumen. Watch closely for any signs that the catheter is infiltrated. Infiltration occurs when the tip of



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the IV is outside the vein and the fluid is entering the tissues instead. It is manifested by localized swelling, coolness, pallor, and discomfort at the IV site.

16. Stabilize the catheter and apply a dressing.

- Secure the catheter according to the manufacturer's instructions and agency policy. Several methods are used to stabilize the catheter including the use of a dressing and securement device. If tape is used, it must be sterile tape or surgical strips and they should be applied only to the catheter adapter and not placed directly on the catheter-skin

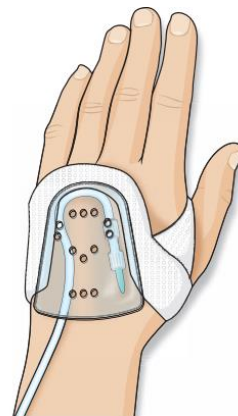
junction site. Use of a manufactured stabilization device is preferred (INS, 2011a).

- Apply a dressing. Two methods are used for applying a dressing: a sterile gauze dressing secured with tape and a TSM dressing. **7** Most common is the TSM because it allows for continuous assessment of the site and is more comfortable than gauze and tape (Phillips & Gorski, 2014, p. 345). Do not use ointment of any kind under a TSM dressing.

Additional tape may be used to secure the IV catheter below the TSM, if necessary. Do not place tape on the TSM dressing.

- Label the dressing with the date and time of insertion, gauge, and your initials. **8**

- Apply an IV site protector, if available. Protective devices are



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available that help prevent dislodgement of the IV catheter and still provide easy assessment of the IV site. **9**

- Loop the tubing and secure it with tape.

17. Discard the tourniquet.

- Remove and discard gloves.

- Perform hand hygiene

18. Ensure appropriate infusion flow.

- Apply a padded arm board to splint the joint if needed.

- Adjust the infusion rate of flow according to the order.

19. Label the IV tubing.

- Label the tubing with the date and time of attachment and your initials. **10** This labeling may also be done when the infusion is started.



20. Document all assessments and interventions.

- Record the venipuncture on the client's chart. Some agencies provide a special form for this purpose. Include the date and time of the venipuncture; type, length, and gauge of the needle or catheter; venipuncture site, how many attempts were made, amount and type of solution used, including any additives (e.g., kind and amount of medications); flow rate; the type of dressing applied; and the client's general response.

EVALUATION

- Regularly check the client for intended and adverse effects of the infusion.

- At least every 4 hours, check the skin status at IV site (warm

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- Perform follow-up based on findings or outcomes that deviated from expected or normal for the client. Relate findings to previous data if available.
- temperature and absence of pain, redness, or swelling), status of the dressing, the client's ability to perform self-care activities, and the client's understanding of any mobility limitations.
- Report significant deviations from normal to the primary care provider.