IV Therapy: Preventing Complications

What is Involved in Preventing Complications of IV Therapy?

 › Intravenous (I.V.) therapy-related complications are adverse events that interrupt the delivery of prescribed I.V. therapies, cause the patient additional pain and distress, and potentially lead to life-threatening complications

 • *What*: I.V. therapy-related complications include infiltration, extravasation, phlebitis, thrombosis, hematoma, embolism, allergic reaction, and localized or systemic infection. For details, see *What You Need to Know Before Preventing/Providing Treatment for IV Therapy Complications*, below

 • *How*: I.V. therapy-related complications have various causes, including trauma to the vein during venipuncture, improper placement of the I.V. catheter, failure to flush the catheter at regular intervals, failure to adequately follow infection control procedures, and allergy to the infused substance. Many I.V. therapy-related complications are preventable by using proper aseptic technique during I.V. insertion and by thorough patient assessment. For information regarding the guidelines for prevention of intravascular catheter-related infections issued by the United States Centers for Disease Control and Prevention Healthcare Infection Control Practices Advisory Committee (CDC/HICPAC) and endorsed by the Infectious Diseases Society of America (IDSA) and the Association for Professionals in Infection Control and Epidemiology (APIC), see *Evidence-Based Care Sheet: Catheter-Related Bloodstream Infections (CRBSIs): Guidelines for Prevention*

 • *Where*: I.V. therapy-related complications can occur in any location where I.V. therapy is administered, including inpatient, outpatient, and home settings

 • *Who*: Nurses are principally responsible for monitoring the condition and patency of I.V. sites and for implementing prescribed treatment if complications arise. While assistive healthcare personnel can be tasked with reporting signs and symptoms of complications (e.g., catheter dislodgement, leakage, hematoma), the primary responsibility for care and monitoring of I.V. catheters and infusion should not be delegated to assistive healthcare staff members

What is the Desired Outcome of Preventing/Providing Treatment for IV Therapy Complications?

 › The desired outcome of preventing I.V. therapy complications is to maintain I.V. patency—allowing for the continued administration of necessary I.V. fluids and medications—and patient safety

Why is Preventing/Providing Treatment for IV Therapy Complications Important?

 › I.V. therapy-related complications interrupt the delivery of prescribed fluids and medication, which can worsen the patient’s clinical status

 • An interruption in anticoagulation therapy (e.g., heparin infusion) can delay relief to ischemic tissue impaired by an occluded blood vessel

 • Interruption in blood transfusion or I.V. fluid administration can have serious consequences for patients in critical condition who require blood products and fluids for survival
• Lack of I.V. access can delay the administration of potentially life-saving emergency medications and fluids
  › Most I.V. therapy-related complications necessitate removal of the I.V. catheter and the insertion of a catheter at a new site, an event that can cause patients pain and distress, and require extra labor and time from the nursing staff
  › Untreated I.V. therapy-related complications can lead to extensive tissue injury, infection, nerve and tendon injury, loss of limb function, amputation, sepsis, and death. Serious I.V. therapy-related complications—those that cause the patient pain or tissue injury or that result in permanent dysfunction—can expose clinicians to legal liability

Facts and Figures
› A quality improvement (QI) team assembled at Cincinnati Children’s Hospital Medical Center implemented several activities to reduce the rate of infiltration/extravasation injuries in pediatric patients. The changes included development of a touch-look-compare method of performing hourly I.V. site assessment, staff training and mandatory repeat demonstration of I.V. site assessment, and performance monitoring. The QI team, which consisted of physicians, nursing administrators, staff nurses, and quality improvement specialists, reported a large initial drop in the mean rate of Grade 2–3 infiltration/extravasation injuries from 4.2 to 1.8 per 1,000 line days before rates stabilized at 18% below those reported pre-intervention (Tofani et al., 2012)

What You Need to Know Before Preventing/Providing Treatment for IV Therapy Complications
› The clinician should be familiar with the causes for and signs and symptoms of common I.V. therapy-related complications
  › **Infiltration**, which is the inadvertent infusion of non-vesicant I.V. medications or solutions into the surrounding tissue, can be evidenced by sluggish or blocked I.V. flow, absence of blood flashback, pain at the I.V. site, coolness of the extremity, edema, and skin that looks blanched, taut, or stretched. Infiltration can occur if the I.V. catheter is not properly inserted or adequately secured (Figure 1) and becomes dislodged, or due to injury to the vein (e.g., rupture). For more information, see *Nursing Practice & Skill ... IV Therapy: Preventing and Treating Infiltration*
  › **Extravasation** is the infiltration of a vesicant (i.e., a corrosive agent capable of causing blistering, sloughing of the skin, local tissue damage, and necrosis; e.g., certain chemotherapeutic agents, DOPamine, vancomycin, phenytoin) into the surrounding tissue. The effects of extravasation can be delayed up to 12 hours following I.V. infusion but can result in extensive nerve damage, tissue sloughing, and necrosis, and can necessitate surgical treatment, even if only a minute amount of the vesicant has infiltrated. Extravasation can occur if the I.V. catheter is not properly inserted or adequately secured and becomes dislodged, or due to injury to the vein (e.g., rupture). (For more information on managing extravasation, see *Nursing Practice & Skill ... Extravasation: Managing*)

![Image](image1.png)

*Figure 1*: Methods for preventing infiltration include properly securing the I.V. catheter and tubing. Copyright © 2014, EBSCO Information Services.

• **Phlebitis** (i.e., inflammation of a vein) is characterized by redness, swelling, pain, and visual or palpable enlargement and hardening of the cannulated vessel (Figure 2). Veins are at particular risk for developing phlebitis following trauma (e.g., venipuncture) that is exacerbated by rapid infusion of irritating solutions (e.g., potassium or magnesium). Phlebitis increases the risk for infiltration because inflammation enlarges gaps between the vein’s cells, allowing fluid to leak out of the vein
into the surrounding tissues, and can be avoided by properly diluting the infusate and by infusing the solution at a slow rate, if possible, to avoid vein irritation (for more information, see Quick Lesson ... Phlebitis, IV-Related or Nursing Practice & Skill ... Phlebitis: Staging and Managing

Figure 2: Phlebitis is characterized by redness, swelling, pain, and visual or palpable enlargement and hardening of the cannulated vessel. Copyright© 2014, EBSCO Information Services.

- **Thrombosis** (also referred to as thrombophlebitis; i.e., formation of a fibrinous clot) can occur from backflow and stasis of blood in the I.V. catheter or tubing or from failing to flush the I.V. catheter at regular intervals. Signs and symptoms of thrombosis include blockage of the I.V. catheter and/or a palpable lump in the cannulated vessel.

- An **allergic reaction** is characterized by itching, swelling, rash, or hives, and can result in life-threatening anaphylaxis (for more information, see Quick Lesson About ... Shock, Anaphylactic). An allergic reaction can be triggered by allergy to the infused substance or to the catheter itself (e.g., allergy to Teflon-coated catheters).

- **Infection.** Localized infection at the insertion site is evidenced by tenderness, swelling, erythema, and purulent drainage. Systemic infection related to I.V. therapy, also known as catheter-related bloodstream infection (CRBSI), can result from a break in aseptic technique during catheter insertion or care, from prolonged use of the I.V. catheter or tubing, or from contamination of the solution, which leads to invasion of pathogens into the subcutaneous tissues and/or bloodstream (i.e., sepsis); sepsis is characterized by fever, chills, nausea and vomiting, malaise, tachycardia, tachypnea, and headache or backache (for more information, see Evidence-Based Care Sheet: Catheter-Related Bloodstream Infections (CRBSIs): Guidelines for Prevention or Quick Lesson About ... Sepsis and Septic Shock).

  - Surgical aseptic technique is practiced in the OR under strict conditions and can be adapted for use outside the OR for situations that require similarly strict application of aseptic technique (e.g., intravascular procedures, including insertion of a central venous catheter). Surgical aseptic technique involves use of sterile equipment and establishment of a sterile field.

  - General aseptic non-touch technique (ANTT) is used during peripheral I.V. catheter insertion and for most catheter-related care. ANTT involves the use of:
    - sterile items and equipment
    - measures to prevent the sterile part of the item/equipment from coming into contact with anything that is not sterile
    - a facility-approved skin preparatory solution to cleanse the site (e.g., > 0.5% chlorhexidine gluconate [CHG], or tincture of iodine, an iodophor, or 70% alcohol if CHG is contraindicated); the skin should not be touched after it has been prepared with antiseptic cleanser

  - For more information, see Nursing Practice & Skill ... Aseptic Technique and Infection Prevention: Applying Principles at the Bedside

- **Hematoma** can occur at or surrounding the I.V. insertion site due to blood pooling into the subcutaneous tissues. Signs and symptoms include localized swelling, bruising of the overlying skin, and tenderness.

- A **catheter embolism** (i.e., release of a fragment of the catheter into the circulatory system) or **air embolism** (i.e., air in the vascular system that creates an obstruction) are potentially **life-threatening** conditions. A catheter embolism can occur due to errors during I.V. placement or repositioning. An air embolism can be caused by an inadvertent infusion of air when the solution bag becomes empty or through a loose connection in the I.V. tubing. For additional information regarding embolism, see Red Flags, below.

- The clinician should have knowledge of typical nursing responsibilities and tasks with regard to I.V. therapy.
Prevention of I.V. therapy-related complications begins with selection of an optimal I.V. catheter insertion site (Figure 3) and correct preparation of the skin prior to I.V. cannulation.

Figure 3: Veins in the forearm suitable for I.V. insertion. This image is in the public domain.

Veins suitable for cannulation are straight and resilient; hard, cord-like veins or those located at a point of flexion (e.g., at the wrist or antecubital fossa) should be avoided because patient movement can cause the catheter to erode the vein wall, which can lead to infiltration. Ideally, veins in the forearm should be used because an I.V. placed in this location can be more easily secured and will not interfere with patient movement. If an I.V. must be placed at the wrist or antecubital fossa, use of an arm board can prevent bending of the joint, reducing the possibility that the I.V. will become kinked, dislodged, or irritate the vein wall.

In some cases, the location of I.V. placement and the size of the I.V. catheter depend upon the treating clinician’s preference. If no preference is stated, it is important to select the smallest gauge catheter that can deliver the prescribed therapy at the desired rate. For example, 26- to 24-gauge catheters are generally appropriate for neonates and 24- to 22-gauge catheters are appropriate for children. This permits greater blood flow around the catheter which will dilute and carry the infusate away from the insertion site and minimize venous irritation.

CDC/HICPAC guidelines regarding skin preparation prior to I.V. cannulation include the following:
- For peripheral venous catheters, clean the site with either 70% alcohol, tincture of iodine, an iodophor, or chlorhexidine gluconate (CHG)—either 2% or 5%
- For central venous catheters, use > 0.5% CHG with alcohol
- Tincture of iodine, an iodophor, or 70% alcohol can be used as an alternative if the patient is allergic to CHG

Monitoring the I.V. site is critical to reduce the risk for complications. Assessment should include visual inspection, palpation, and subjective evaluation for signs of infiltration (redness, tenderness, swelling, drainage) and for other signs and symptoms (e.g., paresthesias, numbness).

In a position paper issued in early 2012, the Infusion Nurses Society (INS) recommended the following schedule for assessment of peripheral I.V. sites and equipment (Gorski et al., 2012):
- **Sites used for continuous infusion**
  - Minimum of every 4 hours for patients
    - undergoing infusion of nonirritant/nonvesicant solutions
    - who are alert and oriented or able to notify the nurse of discomfort
  - Minimum of every 1–2 hours for patients
    - who are critically ill
    - have cognitive or sensory deficits or are unable to notify the nurse of discomfort
    - receiving sedative medications
    - in whom the I.V. catheter is inserted in a high-risk location (e.g., external jugular, antecubital fossa)
  - At least hourly in
    - neonatal patients
    - pediatric patients
  - More frequently than hourly (e.g., every 5–10 minutes) for patients
- receiving vesicants. Note: The INS recommends that nurse clinicians administering vesicant medications advocate for central venous access or limit infusion of vesicants through peripheral I.V.s to less than 30–60 minutes and check for blood return every 5–10 minutes during the infusion
- receiving vasoconstrictors. Note: Central venous access is recommended
- At every home or outpatient visit for patients receiving peripheral infusion at home
- Patients and caregivers should be informed of signs and symptoms of I.V.-related complications, how to assess the site every 4 hours, how to protect the site from injury, and how to contact the treating clinician if problems arise

Sites used for intermittent infusion (saline- or heparin-lock) should be assessed with every catheter access/infusion or at least twice daily. Temperature should also be measured as a means to evaluate for CRBSI (see Red Flags, below, for more information)

Changing the I.V. catheter, dressing, and administration set according to unit-specific/facility/national guidelines will help prevent I.V. therapy-related complications. The most recent guidelines issued by the CDC/HICPAC are as follows:

Catheter replacement (i.e., removal and reininsertion in a new site)
- Peripheral and midline catheters:
  - There is no need to replace peripheral catheters more frequently than every 72–96 hours in adults. Peripheral catheters in children should be replaced only when there is a clinical indication
  - Midline catheters should be replaced only when there is a clinical indication
- Central venous catheters (CVCs), including peripherally inserted central catheters (PICCs) and hemodialysis catheters: CVCs should not be routinely replaced, nor should they be removed on the basis of fever alone
- Umbilical catheters: Optimally, umbilical artery catheters should be removed within five days of insertion. In the absence of signs of a CRBSI, an umbilical venous catheter can be used for up to 14 days, if managed aseptically
- Peripheral arterial catheters should be replaced when there is a clinical indication only. The disposable or reusable transducer should be replaced every 96 hours, together with all other components of the system (e.g., tubing, flush solution, continuous-flush device)

Replacement of I.V. administration sets
- I.V. administration sets that are used for continuous infusion (excluding blood, blood products, or fat emulsions) should be changed no more frequently than 96-hour intervals, but no less frequently than every 7 days
- Tubing used to administer blood, blood products, or fat emulsions should be changed within 24 hours of beginning the infusion
- Tubing used to infuse propofol (Diprivan) should be changed every 6–12 hours or when the medication vial is changed

Dressing change
- Peripheral and midline catheters: The catheter insertion site should be evaluated daily—by palpation if a gauze or opaque dressing is in use or by inspection if a transparent dressing covers the site. Gauze and opaque dressings should not be removed if there are no clinical signs of infection
- CVCs: Sterile gauze or a sterile, transparent, semi-permeable dressing should be used to cover the insertion site. Dressings should be changed if damp, loosened, or visibly soiled or according to the following schedule:
  - Short-term CVCs: Change dressings every 2 days for sites covered with sterile gauze and at least every 7 days for sites covered with transparent dressings
  - Long-term CVCs: Change transparent dressings on tunneled and implanted CVC sites no more frequently than once per week until the site is healed. No recommendation was made for the frequency of dressing change for well-healed sites of long-term cuffed and tunneled CVCs
- Umbilical catheters and peripheral arterial catheters: No specific recommendations were made regarding dressing change for the insertion sites of these devices

Demonstrated competence in medication administration is essential
- All access into the tubing/system should only be through injection ports, which should be disinfected according to facility policy before every access
- When administering prescribed I.V. therapies, adherence to the 6 “rights” of medication administration (i.e., right patient, right drug, right dose, right time, right route, and right documentation following medication administration) is crucial to the prevention of certain I.V. therapy-related complications, including allergy, phlebitis, and infiltration
  - Adhering to the prescribed rate of infusion is particularly important because the risk for phlebitis and infiltration increases with rapid I.V. infusion
- The clinician should be competent in patient assessment related to the skin, circulation, pain level, and vital signs in order to identify signs and symptoms of I.V. therapy-related complications
Preliminary steps that should be performed before providing I.V. therapy-related care and preventing or managing associated complications include the following:

- Review the facility/unit-specific protocols for I.V. therapy, if available
  - Note the facility-approved skin preparatory solution to be used for cleansing the site
- Review the treating clinician’s orders for I.V. therapy, including the prescribed solution to be infused
  - Note the I.V. cannula size; if not specified by the treating clinician or facility protocol, selects the smallest gauge cannula that can deliver the prescribed therapy at the desired rate
- Review the manufacturer’s instructions for all equipment to be used and verify that the equipment is in good working order
- Review the patient’s medical history/medical record for
  - date and time of insertion of I.V. catheter, if already in place
  - most recent dressing and administration set changes
  - initiation of current I.V. therapy
  - any allergies (e.g., to latex, medications, or other substances); use alternative materials, as appropriate

Gather supplies necessary for I.V. therapy, which typically include the following:

- Nonsterile gloves and additional personal protective equipment (PPE; e.g., gown, facemask with eye shield) if exposure to body fluids is anticipated
- Facility-approved pain assessment tool
- Facility-approved antiseptic cleanser and sterile gauze or swabs
- Primary I.V. administration set
- Prescribed I.V. solution
- Normal saline flush
- Needle-free adapter (strongly recommended instead of a hypodermic needle)
- I.V. infusion pump
- I.V. catheter and related supplies (e.g., tape, transparent occlusive dressing)
- Equipment for assessing vital signs

How to Prevent or Manage IV Therapy Complications

- Perform hand hygiene and don gloves and other PPE, as necessary
- Identify the patient according to facility protocol
- Establish privacy by closing the door to the patient’s room and/or drawing the curtain surrounding the patient’s bed
- Introduce yourself to the patient and family member(s), if present; explain your clinical role; assess the coping ability of the patient and the family and for knowledge deficits and anxiety regarding I.V. therapy
  - Determine if the patient/family requires special considerations regarding communication (e.g., due to illiteracy, language barriers, or deafness); make arrangements to meet these needs if they are present
  - Use professional certified medical interpreters, either in person or via phone, when language barriers exist
- Explain the procedure, its purpose, and the expectations for patient participation (e.g., use care during activity to reduce the risk for catheter dislodgement, communicate with the nurse clinician regarding any discomfort at the I.V. insertion site); answer any questions and provide emotional support as needed
- Obtain verbal consent
- Assess the patient’s general health status, including vital signs and pain level using a facility-approved pain assessment tool
  - If the patient is unable to verbalize pain or accurately rate pain, observe for behavioral signs of pain (e.g., combative or confusion in an older adult, irritability in a young child) or utilize a non-verbal pain assessment tool such as the Faces Pain Scale (Figure 4)
  - Consider CRBSI or sepsis if patient has fever, tachycardia, tachypnea, malaise, or nausea
Follow infection control protocols and unit-specific/facility protocols when placing the I.V. catheter

- Select a vein that is straight and resilient and not located at a point of flexion (e.g., at the wrist or antecubital fossa). Using ANTT, cleanse the insertion site prior to cannulation using a facility-approved antiseptic solution.
- Insert the needle bevel up to reduce the risk of puncturing the opposite vein wall which can lead to infiltration. Utilize the smallest gauge I.V. catheter that can adequately deliver the prescribed infusion; use of small gauge catheters are particularly important in patients with fragile veins.
- Secure the I.V. catheter with a transparent, occlusive dressing (transparency will permit visualization and assessment of the underlying skin). Use tape to secure the tubing so that it will not become dislodged with patient movement, taking care not to wrap the tape too tightly around the extremity, which can constrict the vein and contribute to development of phlebitis or infiltration.
- For detailed information on peripheral I.V. insertion, see Nursing Practice & Skill... Peripheral IV (PIV) Catheter: Over-the-Needle Catheter Insertion and Nursing Practice & Skill... Peripheral IV (PIV) Catheter: Winged Needle Catheter Insertion. For detailed information about the use of central venous catheters, see Nursing Practice & Skill... Central Venous Catheters: Using --an Overview.
- Perform frequent assessments of the I.V. site according to patient age, condition, type of infusion, and practice area (e.g., inpatient, homecare).
  - Position the patient in bed or chair so that you can easily access the I.V. site.
  - Verify that the infusion is running at a steady rate by gravity or infusion pump, and has not become sluggish.
  - Evaluate the appearance of the insertion site and surrounding skin for erythema, rash, bruising, drainage, edema, or other visible signs of an I.V. therapy-related complication.
  - Palpate the insertion site and surrounding skin to identify coolness, warmth, edema, blanching, or enlargement or hardening of the cannulated vessel.
  - Assess for pain at the insertion site and along the length of the cannulated vessel.
- Check for patency and proper functioning of the I.V. catheter.
  - If a continuous infusion is running, observe the infusion for sluggishness or blockage which could indicate infiltration or thrombosis; if using an intermittent access device (saline lock), assess for abnormalities while flushing the I.V. catheter according to facility protocol.
  - Check for leakage of I.V. solution at the catheter insertion site or at tubing connection points.
  - Check that the I.V. catheter and tubing are properly secured and not dislodged.
    - The insertion site should be covered with a transparent, occlusive dressing and the tubing secured to the extremity with tape.
    - Stabilize the I.V. catheter using a splint if the patient is highly active or agitated or if the I.V. catheter is located over a point of flexion.
- Replace the I.V. administration set and change the dressing over the insertion site, according to unit-specific/facility protocol.
- If an I.V. therapy-related complication is identified, remove the I.V. catheter (except in some cases of extravasation, see below), notify the treating clinician if the complication is severe, insert an I.V. catheter in a new site if there is a continued...
need for I.V. therapy, and administer treatment per order or unit-specific/facility protocol. I.V. therapy complications are typically managed using the following interventions:

- Catheter or air embolism is a **medical emergency**; treatment measures include frequent monitoring of vital signs, administration of 100% oxygen, and completion of a chest X-ray. If a catheter embolism is suspected, a tourniquet can be applied proximal to the insertion site to prevent further migration of the catheter fragments.
- Infiltration can be managed through application of a cool or warm moist compress and elevation of the affected extremity.
- Extravasation requires immediate, targeted therapy that varies according to the agent extravasated. The I.V. catheter can be left in place and an antidote infused into the tissue, if indicated; extensive treatment (e.g., surgical decompression, debridement) can be necessary depending upon the severity of tissue injury.
- Administration of antimicrobial therapy and antipyretics is typical for localized infection and sepsis. A skin culture can be warranted in cases of localized infection. It is usual to perform a blood culture in patients with signs of sepsis.
- Phlebitis can usually be managed conservatively with application of a warm compress and administration of analgesic medication for discomfort.
- Thrombosis, particularly affecting a deep vein (e.g., axillary or subclavian vein), can require treatment with an antithrombotic agent.
- Administration of an antihistamine, EPINEPHrine, and/or oxygen can be warranted in case of allergic reaction.
- Dispose of used materials in proper receptacles and perform hand hygiene.
- Update the patient’s plan of care, if appropriate, make the appropriate notation in the medication administration record (MAR) if applicable, and document performing the I.V. procedure in the patient’s medical record, including the following information:
  - Date and time of I.V. procedure (e.g., placement of I.V. catheter, administration of I.V. medication or fluid, assessment of the I.V. insertion site)
  - Name of medication or fluid administered, dose, and rate of infusion
  - Indication for medication/fluid administration
  - Patient assessment information, including patient’s response to the procedure
  - Any unexpected patient events or outcomes, interventions performed, and whether or not the treating clinician was notified
  - Patient/family education, including topics presented, response to education provided/discussed, plan for follow-up education, and details regarding any barriers to communication and/or techniques that promoted successful communication.

### Other Tests, Treatments, or Procedures That May be Necessary Before or After Preventing/Providing Treatment for IV Therapy Complications

- Ongoing monitoring of the I.V. site, patient response to I.V. therapy, and patient safety is essential.
- If a complication arises, it will be necessary to remove the existing I.V. catheter and insert a new I.V. catheter in another location. This should be performed as soon as possible for patients who require continuous I.V. therapy or who are being treated for cardiac or respiratory disorders. Reestablish I.V. access in the opposite extremity, if possible, to avoid further complications to the affected extremity.
- In case of extravasation, referrals to orthopedic and plastic surgery specialists are warranted to assist in further assessment and treatment; in case of sepsis, referral to an infectious disease specialist is warranted.
- Report serious complications to the facility’s risk management department per facility protocol.

### What to Expect After Preventing/Providing Treatment for IV Therapy Complications

- The I.V. will remain patent and functional, permitting I.V. medications and therapies to infuse without difficulty. Complications will be promptly recognized and treated according to facility protocol and/or the treating clinician’s orders.

### Red Flags

- Symptoms of embolism include symptomatic hypotension, tachycardia, diaphoresis, dyspnea, cyanosis, loss of consciousness, and cardiac arrest.
  - Catheter embolism is most common with use of inside-the-needlecatheters. To avoid catheter embolism, never attempt to rethread a catheter with a needle or remove a catheter prior to removing the needle.
  - Air embolism is most common with use of central venous catheters than peripheral I.V. catheters, and can result in a fatal heart attack, stroke, or cardiac arrhythmia. Infusion of a large volume of air can cause a life-threatening pulmonary
embolism. To avoid an air embolism, do not allow infusion bags to run dry, be sure to fully prime I.V. tubing before use, and apply an air-tight dressing over central venous catheters.

- Signs and symptoms of localized infection at the insertion site are evidenced by tenderness, swelling, erythema, and purulent drainage. CRBSI is characterized by fever, chills, nausea and vomiting, malaise, tachycardia, tachypnea, and headache or backache.

**What Do I Need to Tell the Patient/Patient’s Family?**

- Explain the purpose of I.V. therapy and the steps involved in placement and care of an I.V. catheter, and address any questions or concerns.
- Educate the patient/family on the importance of avoiding manipulation of the I.V. or tubing, and about mobility limitations, if any, that will be required to avoid inadvertently dislodging the I.V.
- Immediately address any patient complaints of discomfort or other symptoms that occur when flushing the I.V. catheter or during administration of I.V. medications, and apply treatment or comfort measures (e.g., cool compress), as prescribed.

**Note**

Recent review of the literature has found no updated research evidence on this topic since previous publication on September 18, 2015.

**References**


7. Infusion Nurses Society. (2011). Site care and maintenance. *Journal of Infusion Nursing, 34*(1S), S55-S64. (G)


