GUIDELINES FOR PREVENTION OF INTRAVENOUS THERAPY-RELATED INFECTIONS

Introduction:

The intravenous (IV) cannula offers direct access to a patient's vascular system and provides a potential route for entry of microorganisms into that system. These organisms can cause serious infection if they are allowed to enter and proliferate in the IV cannula, insertion site, or IV fluid.

IV therapy-related bacteremia is a potential cause of serious illness or death for patients. Additional cannula-related complications which can occur with or without fever or bacteremia include the following:

- **Phlebitis**: Warm, erythematous skin over an indurated or tender vein and often precedes or is associated with the more severe infections.

- **Occult IV-Site Infection**: Does not produce much (if any) pus or inflammation at the IV site. This is the most common cannula-related infection, may be the most difficult to identify, and is probably associated with more bacteremias than cellulitis or purulent thrombophlebitis.

- **Cellulitis**: Warm, erythematous, and often tender skin surrounding the site of cannula insertion; pus is rarely detectable.

- **Purulent Thrombophlebitis**: Warm, erythematous skin over an indurated or tender vein with purulent drainage from the cannula wound. Pus may drain spontaneously or be expressed with pressure. This infection is dangerous and frequently leads to bacteremia.

**Recommendations**:

1. **Standard Precautions Compliance**: Gloves must be worn for all vascular procedures.

2. **Indications for Use**: Intravenous (IV) therapy should be used only for definite therapeutic or diagnostic indications.
3. Choice of Cannulas

a. Plastic or stainless steel cannulas may be used for routine peripheral IV infusions.

b. For central lines, cannulas with the least number of lumens consistent with the therapeutic needs of the patient should be used, due to the higher risk of infection associated with multi-lumen cannulas. A multi-lumen cannula should be replaced by single-lumen cannula as soon as the patient's condition allows.

c. Peripherally inserted catheters should be used for long term IV therapy (usually greater than 14 days). Sterile technique must be used during insertion.

4. Choice of Site

An upper extremity site (or if necessary, subclavian and jugular sites) should be used in preference to a lower extremity site for IV cannulation. All cannulas inserted into lower extremity should be changed as soon as a satisfactory site can be established elsewhere. Cannulas inserted under emergency condition and with less than optimal asepsis should be changed as soon as the patient's condition is stabilized and a satisfactory site can be established elsewhere.

5. Site Preparation

a. The IV site should be wiped / scrubbed with an antiseptic prior to venipuncture.

b. Alcohol (70%), iodophors, or chlorhexidine can be used. The antiseptic should be applied liberally, with friction, and allowed to remain in contact with the skin for a minimum of 30 seconds prior to venipuncture.

6. Procedures Accompanying Insertion

a. A sterile gauze or transparent dressing should be applied to cover the insertion site.

b. The cannula should be secured to stabilize it at the insertion site.

c. Date of insertion should be recorded in the chart, the kardex, and on the dressing or tape.
7. Maintenance of IV Site

a. Patients with intravenous devices should be evaluated every shift for evidence of cannula-related complications. This evaluation should include gentle palpation of the insertion site through the intact dressing. If a transparent dressing is used, a visual inspection of the site should accompany palpation. If the patient has an unexplained fever or there is pain or tenderness at the insertion site, the dressing should be removed and the site inspected.

b. Peripheral site dressings may remain in place for 72 hours unless they become moist or soiled or must be removed for other reasons.

c. Central line dressing should be changed when the dressing becomes moist or soiled and should be changed at least twice a week. This applies to pic catheters as well.

8. Removal and Replacement of a Cannula

a. Peripheral cannula site, including heparin-lock devices, should be changed every 72 hours.

b. If for any reason a peripheral cannula cannot be removed and replaced after it has been in place for 72 hours, the patient's physician should be notified and the physician should document the indications for prolonged cannulation of a peripheral vein. If the need for vascular access remains and other peripheral sites are not available, a central cannula may be indicated.

c. Central cannulas should be removed when cannula associated infection (local or systemic) is suspected.

9. Special Procedures for Central Cannulas (those whose tips lie in the large central vessels or are threaded into or through the chambers of the heart)
a. Central cannulas should be inserted with aseptic technique and sterile equipment. Sterile gloves and drapes should be used to achieve this objective. A mask should also be worn.

Central cannulas should be removed when they are no longer medically indicated or if they are suspected of causing sepsis.

c. Central cannulas that are inserted through a subclavian or jugular approach need not have the site routinely changed. If prolonged cannulation at a single site is indicated, cannulas may be changed over a guide wire. This is appropriate when there is a change in the number of lumens required.

d. Central cannulas that are inserted through a peripheral site pose a greater risk of cannula-related infection and should be monitored closely and removed at any sign of infection (local or systemic).

10. Maintenance of Administration Sets

a. For adult patients, IV administration tubing, including "piggyback" tubing, extension tubing, CVP manometers, and infusion pump tubing; and pressure monitoring tubing and transducer (for any site) should be changed every 72 hours.

b. For neonates and pediatric patients, IV administration tubing, including "piggyback" tubing, extension tubing, and infusion pump tubing; and pressure monitoring tubing and transducer (for any site) should be changed every 72 hours (3 days).

c. Tubing for hyperalimentation should be changed every 48-72 hours.

d. Tubing should be changed after the administration of blood, blood products, or lipid emulsions.

e. Between changes of components, the IV system should be maintained as a closed system. All entries into the tubing, as for administration of medication, should be made through injection ports that are disinfected with 70% alcohol just prior to entry.
f. Irrigation of the system to improve flow should be avoided.

g. Blood specimen withdrawal through an IV administration tubing, except in an emergency or when immediate discontinuation of the cannula and tubing is planned, is not recommended.

11. Actions for Infection or Phlebitis

   a. For purulent thrombophlebitis, cellulitis, or IV-related bacteremia, the entire IV system (cannula, administration set, and fluid) should be changed.

   b. For phlebitis without signs of infection, the cannula should be changed.

12. Culturing for Suspected IV-related infections

   a. If an IV system is to be discontinued because of suspected IV-related bacteremia/sepsis, the skin at the skin-cannula junction should be cleaned with alcohol and the alcohol allowed to dry before cannula removal. The cannula tip should be sent for culture using semi-quantitative technique. Send 3-4 inches of the cannula tip, cut with sterile scissors, in a dry specimen container. **DO NOT** place tip in culture media of any kind.

   b. Blood cultures (2 sets) should be obtained in conjunction with a cannula tip culture. Whenever possible, blood cultures should **not** be obtained through the cannula suspected to be related to infection.

   c. Cannula entry site cultures are **not** recommended because they are a poor predictor of the organism responsible for cannula related sepsis (Golledge & McPherson, 1988).

   d. If an IV system is discontinued because of suspected fluid contamination, the fluid should be cultured and the implicated container (bottle or bag) saved in the unit's specimen refrigerator.

   e. If contamination of fluid is confirmed, the implicated container and the remaining units of the implicated lot should be saved, and the lot number of fluid and additives should be recorded. Notify Infection Control and Pharmacy.

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If intrinsic contamination (contamination during manufacturing) is suspected, Infection Control and Pharmacy will notify the appropriated agencies (local health authorities, Centers for Disease Control, and the U.S. Food and Drug Administration). Quality Control During and After Admixture

a. Parenteral and hyperalimentation fluids should admixed (compounded) in the Pharmacy.

b. In the Pharmacy, a laminar-flow hood should be used for admixing parenteral fluids.

c. Containers of parenteral fluids should be checked for visible turbidity, leaks, cracks, and particulate matter, and for the manufacturer's expiration date before admixing and before use. If a problem is found, the fluid should not be used.

d. Single-dose vials should be used for admixture whenever possible. When multiple-dose vials are used, the product label or package insert should be consulted to determine if refrigeration of the vial is necessary. (The proper storage temperature is product specific and is determined by many factors, such as stability of ingredients and optimal activity of antibacterial preservatives; bacteria survival in some containers may be enhanced by refrigeration.).

e. A distinctive supplementary label will be attached to each prefilled or admixed parenteral stating (as a minimum) the drugs and their dosage, the time and date of compounding or drawing up, the expiration time (not to exceed 24 hours), and the person who did the compounding.

f. Admixed fluids or prefilled syringes should be refrigerated, unless contraindicated, or used within 6 hours.

g. If necessary, admixed parenterals may be stored under refrigeration for up to one week before use, provided refrigeration is continuous and begins immediately after admixing. Other factors such as stability of ingredients may dictate a shorter storage time.

h. Once started, large volume parenterals should be completely used or discarded within 24 hours.

Infusions of lipids should be completed within 12 hours of starting.

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14. IV Filters

Using IV in-line filters is not recommended as a routine infection control measure.

References:


