IV administration set priming

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Introduction

Before using an IV administration set to administer IV solution, it's necessary to prime the set with IV solution to purge it of air. IV administration set priming requires sterile no-touch technique to prevent contamination and reduce the risk of vascular catheter–associated infection.[1]

◆ ***Hospital-acquired condition alert:*** Keep in mind that the Centers for Medicaid and Medicare Services considers vascular catheter–associated infection a hospital-acquired condition *because it can be reasonably prevented using a variety of best practices.* Make sure to follow evidence-based infection prevention practices, such as performing hand hygiene and following sterile no-touch technique, when priming an IV administration set *to reduce the risk of vascular catheter–associated infections.*[2][3][4][5] ◆

A vented IV administration set infuses a solution prepared in a glass or semirigid container. A nonvented IV administration set infuses a solution prepared in a plastic fluid container. To ensure a secure junction and prevent dangerous disconnections, an IV administration set should be attached to a vascular access device hub or an access site with a luer-locking mechanism.[1]

Equipment

- IV administration set
- IV pole
- IV solution container
- Labels
- Optional: add-on filter, flow-control device

Preparation of Equipment

Inspect all IV equipment and supplies. If a product is expired, is defective, or has compromised integrity, remove it from patient use, label it as expired or defective, and report the expiration or defect as directed by your facility.[6]

Prepare the IV solution container. (See the "IV bag preparation" procedure.)

Implementation

- Verify the practitioner's order.
- Gather and prepare the necessary equipment and supplies.
- Perform hand hygiene *to prevent contamination.*[4][7][8][9][10][11][12][13]
- Close the flow clamp on the IV administration set.
- Remove the protective cap from the IV administration set spike.
- Holding the port of the IV solution container firmly with one hand, insert the administration set spike into the port with your other hand. Be careful not to contaminate the port or spike.

- Hang the IV solution container on the IV pole, if you haven't already, and squeeze the drip chamber until it's one-half full.
- Leave the protective cover on the end of the IV administration set tubing, hold the tubing above waist level, aim the distal end of the tubing over a wastebasket or sink, and slowly open the flow clamp.
- If the IV administration set has an in-line filter, prime it according to the manufacturer's instructions. If the use of an add-on filter is necessary, purge the IV administration set tubing before attaching it *to avoid forcing air into the filter and possibly clogging some filter channels.* Attach an add-on filter to the end of the IV administration set tubing as close to the catheter insertion site as possible. Then follow the manufacturer's instructions for filling and priming it.[14] (See *Using filters*.)

EQUIPMENT

USING FILTERS

Filters help prevent undesirable substances from entering the vascular system. The type of infusate determines the size and type of filter; follow the manufacturer's instructions for use. The filter may be an add-on device or an in-line filter, which is part of the IV administration set tubing. Consult the information below about filter use, or check with a pharmacist and the manufacturer's specific recommendations if you're unsure about the type of filter to use or whether a filter is necessary:[14] [15] [16]

- Use an in-line filter whenever possible to reduce the risk of contamination, misuse, and accidental misconnection.[14]
- Apply or replace an add-on filter with each change of the IV administration set.[14]
- Guidelines recommend a 1.2-micron filter for all parenteral nutrition regimens, including dextrose–amino acid admixtures, total nutrient admixtures, and lipid injectable emulsions. (If the manufacturer requires a specific filter, consult the manufacturer's instructions for use.) If administering a dextrose–amino acid admixture and lipid injectable emulsion as separate infusions, ensure that the filter location is below the Y-site where the infusions meet.[17]
- When using an electronic infusion device, ensure that the filter is designed to work with the electronic infusion device. Check the manufacturer's recommendations before use.[18]
- When using a syringe pump for small-volume infusion, be aware that an in-line filter makes no difference in in-line pressure monitoring, pump start-up delay, flow variability, or time to reach steady-state flow.[14]
- Avoid using a filter with very small volumes because the filter may retain the drug and decrease the administered dose.
- Use an air-eliminating filter for a patient with a right-to-left shunt heart defect.[14]

- Leave the flow clamp open until the IV solution flows through the entire length of the IV administration set tubing *to release trapped air bubbles and force out all the air.*
- Invert all Y-ports and back-check valves. Tap them, if necessary, *to fill them with solution.*
- Close the flow clamp.
- Loop the IV administration set tubing over the IV pole until you're prepared to attach the tubing to the venous access device.
- Attach a flow-control device, if necessary, following the manufacturer's instructions. (See the "IV pump use" procedure.) Choose a flow-control device that's appropriate for the severity of

illness, the type of therapy, the type of vascular access device, dosing considerations, drug stability, rate of infusion, the health care setting, the risk of therapy adverse effects, and the patient's age, acuity, and mobility.[18]
- Label the IV administration set tubing with the date of initiation as directed by your facility.[1]
- Label the tubing with the infusing solution or medication at both the distal (near the patient connection) and proximal (near the source container) ends *to reduce the risk of misconnection* when using multiple IV lines.[19]
- Perform hand hygiene.[4][7][8][9][10][11][12][13]
- Document the procedure.[20][21][22][23][24]

Special Considerations

- Always use sterile no-touch technique when preparing IV solutions.[1] If you contaminate the IV administration set or IV solution container, replace it with a new one *to prevent introducing contaminants into the system.*
- Replace add-on devices (such as filters) each time you use a new IV administration set.[25]
- Change primary and secondary continuous administration sets for administering solutions other than lipid, parenteral nutrition, blood, or blood products at least every 7 days (unless otherwise directed by the manufacturer's instructions) and immediately upon suspected contamination or when the integrity of the product or system has been compromised. In addition to routine changes, change the administration set whenever the vascular access device is changed or when a new vascular access device is inserted.[1]
- Change administration sets used for parenteral nutrition (with or without lipids), including in-line and add-on filters, at least every 24 hours. Change the set with each new parenteral nutrition container.[1]
- Change administration sets used for injectable lipid emulsions that are infusing separately every 12 hours; change the set with each new fat emulsion container.[1]
- Change administration sets (and add-on devices) used to administer propofol infusions at least every 6 to 12 hours according to the manufacturer's instructions.[1]
- The Joint Commission issued a sentinel event alert related to managing risk during transition to new International Organization for Standardization tubing standards that were designed to prevent dangerous tubing misconnections, which can lead to serious patient injury and death. During the transition, make sure to trace the tubing and catheter from the patient to the point of origin before connecting or reconnecting any device or infusion, at any care transition (such as a new setting or service), and as part of the handoff process; route tubes and catheters having different purposes in different standardized directions; when there are different access sites or several bags hanging, label the tubing at both the distal and proximal ends; use tubing and equipment only as intended; and store medications for different delivery routes in separate locations.[19]

Complications

Complications associated with improper IV administration set priming may include:

- vascular catheter–associated infection.[5]

Documentation

Documentation associated with IV administration set priming includes:

- type of IV solution used
- add-on devices used.

This procedure has been reviewed by the Academy of Medical-Surgical Nurses.

AMSN Academy of Medical-Surgical Nurses

Related Procedures

- IV bag preparation
- IV bottle preparation, nonvented
- IV bottle preparation, vented
- IV solution change
- IV solution preparation, adding medications to the container

Related UpToDate Patient Teaching Handouts

- What to watch for when you have an IV

References

(Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions)

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Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions

The following leveling system is adapted from *Evidence-Based practice in nursing & healthcare: A guide to best practice,* Fifth edition, by Bernadette Mazurek Melnyk and Ellen Fineout-Overholt (2023).

Level I	Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs)
Level II	Evidence from well-designed single RCTs (experimental)

Level III	Evidence from well-designed nonrandomized controlled trials (quasi-experimental), systematic reviews of a complete body of evidence, and intervention studies using mixed methods
Level IV	Evidence from well-designed case-control and cohort studies (observational)
Level V	Evidence from systematic reviews of qualitative and descriptive studies
Level VI	Evidence from single descriptive and qualitative studies, evidence-based practice implementation, and quality improvement projects
Level VII	Evidence from expert opinion, expert committee reports, and literature reviews

Data from Gyatt, G., & Rennie D. (2002). Users' guides to the medical literature. American Medical Association; Harris, R. P., et al. (2001). Current methods of the U.S. Preventative Services Task Force: A review of the process. American Journal of Preventative Medicine, 20, 21-35.