CRENSHAW
COMMUNITY HOSPITAL

Education Department

LPN IV Therapy

Welcome to Crenshaw Community Hospital. We want all our nurses to be comfortable in the skills they may need to perform at our facility. The following study guide will help you understand our LPN IV Therapy policy. Please study the guide as you will be tested on this material. We require all LPNs to become certified in IV Therapy if you are being hired for a role in a unit where you may be required to perform IV Therapy. There is an initial certification process that includes a checkoff sheet that you need to print (included in this study guide), and you will need to recertify annually. If you have any questions, please consult with your department manager.

Thank you!

Tim Hopper
Director of Education

Crenshaw Community Hospital Policies and Procedures	Policy Number MS.1100.0180	Effective Date 9/2012
	Revision Date 2/12/2023	Review Date
Manual: Nursing Title: Intravenous Therapy by LPN	_____ Chief Of Staff Administrator	

ADMINISTRATION OF INTRAVENOUS THERAPY
BY LICENSED PRACTICAL NURSES

Purpose:
To provide guidelines for the LPN to administer IV therapy in compliance with the Alabama Board of Nursing requirements regarding competency, as outlined in the Standards of Nursing Practice, 610-X-6-14.

Policy:
LPNs who are employed by Crenshaw Community Hospital must demonstrate competence in and knowledge of the principles of IV therapy by meeting the following requirements for advanced training:

1. Initially completing the CCH IV Skills Written Competency with his/her unit manager and with a Registered Nurse checking and signing off the skills as they are completed, scoring at least 85% on the written test.
2. LPNs who have taken the initial advanced IV therapy education including theory and have successfully completed and documented (3) IV starts must repeat an annual refresher course with the same requirements of the initial course. This annual refresher course will be due each calendar year and is the responsibility of the LPN to ensure it is completed.
3. Completed certifications and recertifications will be maintained in the Education central employee file.

Crenshaw Community Hospital

INITIAL

Initial Skills Competency: LPN IV THERAPY

Name: _____ **Date:** _____

Home Unit: ☐ED ☐Med/Tele ☐Surgery **Manager:** _____

	Yes	No	Preceptor Initial
1. Recognizes the hospital policy regarding LPN IV Therapy and Alabama Board of Nursing LPN Scope of Practice a. Successful completion of an organized program of study b. Supervised clinical practice c. Demonstrated clinical competence according to hospital policy.			
2. Has completed the following initial training: a. Anatomy and physiology b. Fluid and electrolyte balance c. Equipment and procedures used in IV therapy d. Complications, prevention, and nursing intervention e. The introduction of a peripheral intravenous device on an adult patient f. Setup, replacement, and removal of intravenous tubing for gravity flow and/or pump infusion g. Intravenous fluid infusion calculations, and adjustment of flow rates on intravenous fluids, and administration of intravenous medications by piggyback. h. Procedures for reconstituting and administering intravenous medications via piggyback including but not limited to pharmacology, compatibilities, and flow rates.			
3. Documentation of the procedures associated with IV Insertion, therapy, and removal.			
Initial observation by qualified RN required	**Employee**	**Date**	**RN Initials**
1. Initial insertion of peripheral IV access under direct supervision of qualified RN			
2. Second insertion of peripheral IV access under direct supervision of qualified RN			
3. Third insertion of peripheral IV access under direct supervision of qualified RN			

_____
LPN Signature

_____
Insertion #1 RN Preceptor Signature

_____
Insertion #2 RN Preceptor Signature

_____
Insertion #3 RN Preceptor Signature

CRENSHAW COMMUNITY HOSPITAL

LPN
IV THERAPY
STUDY GUIDE
FOR NURSES

In order to comply with the rules and regulations set forth by the Alabama Board of Nursing, the LPN must show competency in IV therapy and must maintain this competency with periodic documentation. At CCH, this will be accomplished by successful completion of this self-study course, and three documented successful IV starts per year. It is the responsibility of the LPN to complete the competency paperwork and submit to his/her Manager annually.

LPNs are able to participate in IV therapy in accordance with the following guidelines:

The Alabama Nurse Practice Act, **Code of Alabama, 1975**, § 34-21-1, Standards of Nursing Practice, Section 610-X-6-.14:

Intravenous (IV) Therapy by Licensed Practical Nurses.

(1) A licensed hospital may develop a standardized procedure, as defined in Rule 610-X-6-.12, for intravenous (IV) therapy by a licensed practical nurse.

(2) The minimum requirements for a licensed practical nurse to perform IV therapy includes successful completion of an organized program of study, supervised clinical practice, and demonstrated clinical competence, initially and at periodic intervals according to the requirements of Rule 610-X-6-.12.

(3) The minimum training for the licensed practical nurse that performs selected tasks associated with IV therapy shall include:

(a) Anatomy and physiology

(b) Fluid and electrolyte balance

(c) Equipment and procedures utilized in intravenous therapy

(d) Complications, prevention, and nursing intervention

(e) Introducing a peripheral intravenous device on an adult patient

(f) Set-up, replacement, and removal of intravenous tubing for gravity flow and/or pump infusion

(g) Intravenous fluid infusion calculations, and adjustment of flow rates on intravenous fluids, and administration of intravenous medications by piggyback

(h) Procedures for reconstituting and administering intravenous medications via piggyback including but not limited to pharmacology, compatibilities and flow rates

References for the self-study course:

Manual of Nursing Practice (8th ed.)(2006). Philadelphia: Lippincott Williams & Wilkins.

Alabama Nurse Practice Act, Code of Alabama, 1975, Standards of Nursing Practice, Section 610-X-6-.14. Retrieved from: http://www.abn.state.al.us/Content.aspx?id=130

Phillips, L: Manual of IV Therapeutics, ed. 4. F.A.Davis, Philadelphia, 2005.

Centers for Disease Control, MMWR, Vol. 51, No. 32, Appendix B, "Summary of Recommended Frequency of Replacements for Catheters, Dressings, Administration Sets, and Fluids. Retrieved from: http://www.cdc.gov/mmwr/PDF/wk/mm5132.pdf

Indications for Intravenous Therapy

Patients receive a variety of substances via IV therapy, including fluids, electrolytes, nutrients, blood products, and medications. Patients can receive life-sustaining fluids, electrolytes, and nutrition when they are unable to eat or drink adequate amounts. The IV route also allows rapid delivery of medication in an emergency. Many medications are faster acting and more effective when given via the IV route. Other medications can be administered continuously via IV to maintain a therapeutic blood level. Patients with anemia or blood loss can receive lifesaving IV transfusions. Patients who are unable to eat for an extended period can have their nutritional needs met with total parenteral nutrition (TPN).

Goals of IV Therapy

- Maintain or replace body stores of water, electrolytes, vitamins, proteins, fats, and calories in the patient who cannot maintain adequate intake by mouth.
- Restore acid-base balance.
- Restore the volume of blood components.
- Administer safe and effective infusion of medications by using the appropriate vascular access.
- Promote nutrition while resting the GI tract.

Types of Fluids

Fluids and electrolytes administered intravenously pass directly into the plasma space of the extracellular fluid compartment. They are then absorbed based on the characteristics of the fluid and the hydration status of the patient. The most commonly infused fluids are dextrose and sodium solutions. These are called crystalloid solutions.

Dextrose Solutions

Dextrose in water is available in many concentrations and provides carbohydrates in a readily usable form. Solutions of 2.5%, 5% and 10% dextrose in water are used for continuous peripheral infusions. Concentrations of 20% and above must be given into a large vein and are infused via a central line. These high concentrations can be used for treating hypoglycemia or in combination with TPN because they supply a large number of calories. **Note:** Use cautiously in patients with water intoxication (hypernatremia).

Sodium Chloride Solutions

Sodium chloride solutions are available in concentrations of 0.25%, 0.33%, 0.45%, 0.9% (normal saline), 3%, and 5%. Combination dextrose and sodium chloride solutions, such as 5% dextrose with 0.45% sodium chloride (often referred to as "D5 and a half"), are commonly used.

Electrolyte Solutions

Electrolyte solutions are used to replace lost fluids and electrolytes. Lactated Ringer's solution is an example of a pre-mixed electrolyte solution. Potassium is an electrolyte that is commonly added to a solution to replace deficits. Potassium is limited to 10 to 20 mEq per hour and is never administered as an IV bolus because of the risk of cardiac complications and death with rapid infusion.

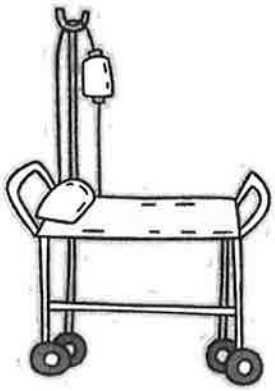
Tonicity of IV Solutions

Intravenous fluids may be classified as isotonic, hypotonic, or hypertonic.

- Isotonic Solutions
  Isotonic solutions have the same concentration of solutes to water as body fluids. They exert the same osmotic pressure as that found in plasma. Examples of isotonic solutions are: 0.9% Sodium Chloride, Lactated Ringer's, and D5W.

- Hypotonic Solutions
  Hypotonic solutions are used when fluid is needed to enter the cells, as in the patient with cellular dehydration. This type of solution exerts less osmotic pressure than that of blood plasma. Administration of this fluid generally causes dilution of plasma solute concentration and forces water movement into cells to reestablish intracellular and extracellular equilibrium; cells will then expand or swell. Examples of hypotonic solutions are: 0.45% Sodium Chloride and 0.33% Sodium Chloride.

- Hypertonic Solutions
  Hypertonic solutions are used to expand the plasma volume, as in the hypovolemic patient. They are also used to replace electrolytes. Hypertonic solutions exert a higher osmotic pressure than that of blood plasma. Administration of this fluid draws water out of the cells and into the extra cellular compartment to restore osmotic equilibrium; cells will then shrink. Examples of hypertonic solutions are: 5% dextrose in 0.9% sodium chloride and 5% dextrose in lactated Ringer's solution.



Types of Infusions

Continuous Infusion

In a continuous infusion, the physician orders the infusion in milliliters (ml) to be delivered over a specific amount of time; for example, 100 ml per hour. The infusion is kept running constantly until discontinued by the physician. An IV controller or roller clamp allows the solution to infuse at a constant rate.

Intermittent Infusions

Intermittent IV lines are "capped off" with an injection port and used only periodically. Thus intermittent IV therapy is administered at prescribed intervals. You must ensure than an intermittent catheter is patent (not occluded with a clot) before injecting a drug or solution. Draw back with a syringe to check for backflow of blood before injection. Sites that are capped with an injection cap are called saline or heparin locks. Here at CCH, we call these "INTs."

Bolus

A bolus drug (sometimes called an IV push or IVP drug) is injected slowly via a syringe into the IV site or tubing port. It provides a rapid effect because it is delivered directly into the patient's bloodstream. Bolus drugs can be dangerous if they are given incorrectly, and a drug reference should always be checked to determine the safe amount of time over which the drug can be injected. IV push drugs are not administered by LPNs at CCH.

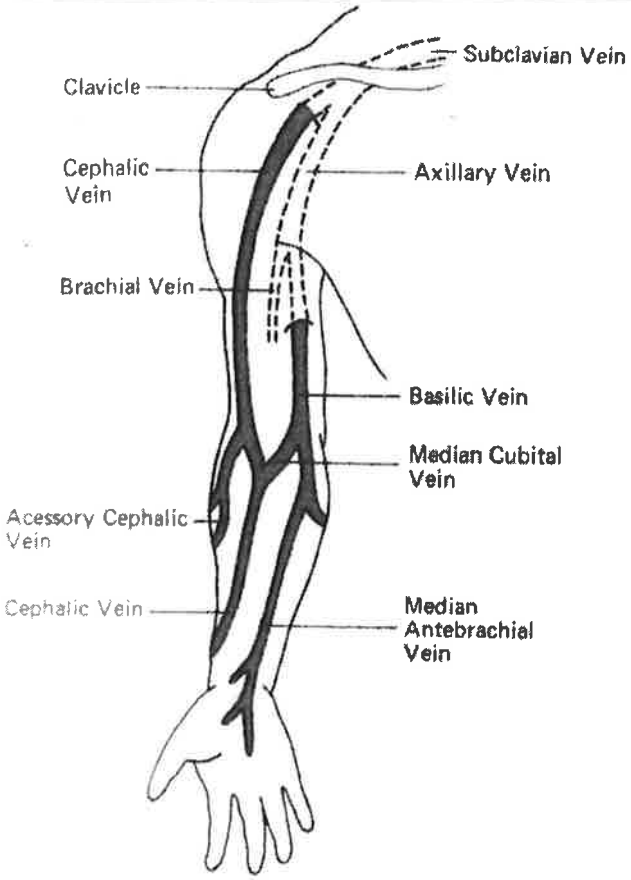
Piggy Back/Secondary Infusion

Some IV medications, such as antibiotics, need to be infused over a short period of time. For example, an antibiotic may be mixed with 50ml of dextrose solution and infused over 30 minutes. This may be done as an intermittent infusion, as described above. If the patient already has a primary continuous IV infusing, the antibiotic (secondary) infusion can be "piggybacked" into the primary IV line. In order for the piggyback medication to infuse, it must hang higher than the primary infusion. Piggy back medications can be infused using either gravity or a controller. The medication in the piggyback must be compatible with any other solution that is in the primary IV tubing.

Infusion Control Device

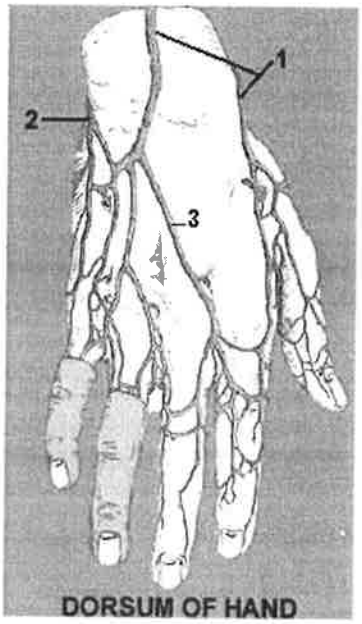
IV pumps may be used for continuous or intermittent infusions. There are advantages to using a pump. A pump allows fluid volume to be delivered with accuracy and will sound an alarm when an occlusion is present or air is in the line. The disadvantage of using a pump is that most pumps will continue to infuse despite the presence of infiltration.

Nursing Care Tip: Always check for catheter patency before injecting any substance into the circulatory system!



Superficial veins of the right upper limb.

1. Cephalic vein
2. Basilic Vein
3. Metacarpal veins



General Considerations When Initiating Intravenous Therapy

1. Use veins in the upper part of the body.
2. When multiple sticks are anticipated, make the first venipuncture distally and work proximal with subsequent punctures.
3. If therapy will be prescribed for longer than 3 weeks, a long-term access device should be considered.
4. Avoid using venipunctures in affected arms of patients with radical mastectomies or a dialysis access site.
5. If possible, avoid taking a blood pressure on the arm receiving an infusion because the cuff interferes with blood flow and forces blood back into the catheter. This may cause a clot or cause the vein or catheter to rupture.
6. No more than two attempts should be made at venipuncture before getting help.
7. Immobilizers should not be placed on or above an infusion site.

Selecting a Vein

First verify the order of the IV therapy.
Explain the procedure to the patient.
Select a vein suitable for venipuntcure.

a. Back of hand—metacarpal vein; avoid digital veins if possible.
   Permits arm movement.
   If a vein problem develops later at the site, another vein higher up the arm may be used.
b. Forearm—basilica or cephalic vein.
c. Inner aspect of elbow, antecubital fossa—median cephalic for relatively short term infusion, however, use of these veins prevents bending of arm.
d. Lower extremities.
   Foot-venous plexus of dorsum, dorsal venous arch, medial marginal vein, ankle—great saphenous vein.

   Note: At CCH, foot veins can only be used with a physician's order in a non-ambulatory patient.

e. Central veins are used when medication and infusions are hypertonic or highly irritating, requiring rapid, high-volume dilution to prevent systemic reactions and local venous damage and when peripheral blood flow is diminished or when peripheral vessels are not accessible.

Central Venous Catheters

Central venous catheters terminate in the superior vena cava near the heart. They are used when peripheral sites are inadequate or when large amounts of fluid or irritating medication must be given. Central catheter devices include a percutaneous catheter, peripherally inserted central catheter (PICC), tunneled catheter, and implanted port. These devices can have one, two, or three lumens in the catheter or one or more port chambers. Each lumen exits the site in a separate line, called a tail. Multilumen catheters allow for the administration of incompatible solutions at the same time.

Be careful not to confuse a central catheter with a dialysis catheter. Dialysis catheters should be used only for dialysis and not for IV therapy, and should be accessed only by physicians or specially trained dialysis nurses.

Administering Peripheral IV Therapy

Starting a Peripheral Line

Phillips 15-Step Method for Starting a Peripheral Line

Phase	Step
Precatheterization (preparation)	1. Check physician's order.
	2. Wash hands thoroughly.
	3. Prepare the equipment.
	4. Assess the patient.
	5. Select the site and dilate the vein.
Catheterization (venipuncture)	6. Select the needle (catheter).
	7. Put on gloves.
	8. Prepare the site.
	9. Enter the vein using the direct or indirect method.
	10. Stabilize the catheter with tape, and apply dressing.
Post-Catheterization (cleanup)	11. Label the site, tubing, and bag.
	12. Properly dispose of used equipment.
	13. Educate the patient.
	14. Calculate the drip rate, if applicable.
	15. Document the procedure.

Source: Phillips, L: Manual of IV Therapeutics, ed. 4. F.A.Davis, Philadelphia, 2005.

Equipment

- Clean gloves
- Prepping solution (70% isopropyl alcohol, povidone-iodine [betadine], or chlorhexidine)
- Sterile 2-inch by 2-inch gauze pads
- ½ inch or 1-inch tape
- Disposable latex (or nonlatex, in the case of allergy) tourniquet
- Catheters
- Appropriate administration set
- IV solution (inspected for puncture holes, visible contamination, and expiration date)
- PRN device (locking device) if the catheter is maintained as a saline lock
- IV pole / pump if necessary

Once the solution is verified and inspected for integrity, the administration set is spiked to puncture the solution bag or bottle, taking care to keep the spike and the bag opening sterile. The administration set is then primed with the IV solution ordered by the physician.

Assess and Prepare Patient

Several factors should be considered before venipuncture. The type of solution, condition of vein, duration of therapy, catheter size needed, patient age, patient activity, presence of disease or previous surgery, presence of a dialysis shunt or graft, medications being taken by the patient (such as anticoagulants), and allergies must be assessed before a venipuncture. Provide privacy for the procedure, explain the procedure to the patient, and evaluate the patient's knowledge of the procedure by talking with the patient before assessing for suitable venipuncture sites.

Select Site and Dilate Vein

Proper vein selection is important to accommodate the prescribed therapy and to minimize potential complications. Vein size must also be considered. Small veins to do not tolerate large volumes of fluid, high infusion rates, or irritating solutions. Large veins should be used for these purposes.

If veins are constricted, venipuncture is more difficult. Fever, anxiety, and cold temperatures can cause veins to constrict. Smoking before the insertion of an IV line also causes veins to constrict.

A tourniquet helps to dilate and stabilize the vein, easing venipuncture and threading of the catheter. Place the tourniquet 6 to 8 inches above the insertion site. If the tourniquet is too close to the insertion site, it will create too much pressure and cause the vein to burst. The tourniquet should be tight enough to impede venous flow while maintaining arterial flow. A tourniquet should be at least 1 inch wide and should not be left on for more than 3 minutes to prevent impaired blood flow to the extremity.

Occasionally, additional techniques are necessary to distend the vein. Placing the arm in a dependent position or placing a warm towel over the site for several minutes before applying the tourniquet helps to dilate a vein. The whole extremity must be warmed to improve blood flow to the area. Opening and closing the fist pumps blood to the extremity and increases blood flow to help dilate the vein. A blood pressure cuff inflated to 30 mm Hg is an appropriate method for vein dilation, especially with fragile veins in the elderly.

Nursing Care Tip:
Most patients know from experience if their veins are difficult to access. Asking the patient for his or her "best vein" may decrease the number of attempts prior to successful IV catheterization. In addition, when selecting a hand vein, consider avoiding the patient's dominant hand to

avoid possible accidental patient removal of the IV.

Choose the Catheter

Needles have been largely replaced with flexible plastic catheters that are inserted over a needle. The needle (or stylet) is removed after the catheter is in place. These are available in a variety of sizes (gauges) and lengths. For patient comfort, choose the smallest gauge catheter that will work for the intended purpose. Use smaller gauge catheters (20 to 24 gauge) for fluids and slow infusion rates. Use larger catheters (18 gauge) for rapid fluid administration and viscous solutions such as blood. Also consider vein size when choosing a catheter gauge.

Gloves

The CDC recommends following standard precautions whenever exposure to blood or body fluids is likely. Wearing latex or vinyl gloves provides basic protection from blood and body fluids.

Prepare the Site

Clean the peripheral insertion site with an antimicrobial solution before catheter placement. If the patient's skin is dirty, wash it with soap and water before applying the antimicrobial solution. If the patient has excess hair, it can be clipped with scissors.

Clean skin with alcohol prep or chlorhexidine prep. Apply in a circular motion, starting at the intended site and working outward to clean an area 2 to 3 inches in diameter. If alcohol is used, it should be applied with friction for at least 30 seconds or until the final applicator is visually clean. Blotting of excess solution at the insertion site is not recommended. Allow the solution to air dry completely.

Insert the Catheter

Venipuncture can be performed using a direct or indirect method. The direct method is appropriate for small-gauge catheters, fragile hand veins, or rolling veins. The indirect method can be used for all venipunctures.

Hold the catheter with the bevel (slanted opening) of the needle facing up. With the tourniquet in place, enter the vein using either the direct or indirect approach. When using the direct entry approach, hold the needle at a 30-45 degree angle directly above the vein and then penetrate the skin and vein in one motion.

The indirect approach may help decrease vein collapse. To use it, hold the needle at a 30-45 degree angle over the skin next to (not over) the vein. Once the skin is punctured, lower the needle angle and locate and puncture the vein. Depending on the type of device used, a small flash of blood may be seen in the tubing or at the hub of the catheter when the needle is in the vein. The angle of the needle is then lowered so that it is parallel with the skin as it is threaded into the lumen of the vein. Advance the needle approximately ¼ inch and then advance the catheter for its remaining length as the metal needle (stylet) is withdrawn.

Release tourniquet and connect the extension set and/or fluids.

Stabilize the Catheter and Dress the Site

A common problem in IV therapy is dislodgement of the catheter. Secure taping keeps the catheter in place and stable, thus preventing complications caused by damage to the intima of the vein. Take care to apply tape in a manner that does not constrict blood flow to the extremity.

A transparent dressing allows the nurse to stabilize the catheter and monitor the venipuncture site for redness or swelling and provides an occlusive dressing for the site.

Label the IV site with date, time, catheter size, and initials.

Dispose of equipment in sharps container.

Calculating Drip Rates

When using a gravity set, the nurse must calculate the drops required per minute to deliver fluid at the ordered rate. IV tubing sets vary in the number of drops delivering 1 ml. Sets typically deliver 10, 15, 20, or 60 drops per milliliter of fluid. For example, to deliver 100 ml per hour using a set with 10-drop factor tubing, a flow rate of 17 drops per minute is necessary. To administer the same amount using a set with 15-drop factor tubing, a flow rate of 25 drops per minute is necessary. Check the label on the administration set to determine how many drops per milliliter (drop factor) are delivered by the set. Sets delivering 10, 15, or 20 drops per minute are called macrodrip sets, and are used for fluids that need to be infused more quickly. Sets delivering 60 drops per milliliter are called minidrop or microdrip sets and are used for solutions that need to be infused more slowly.

Calculate the infusion rate using the following formula:

$$\text{Drops/minute} = \frac{\text{total volume infused x drops/ml}}{\text{total time for infusion in minutes}}$$

Example: Infuse 150 ml of D5W in 1 hour (set indicates 10 drops/ml)

$$\frac{150 \times 10}{60 \text{ min.}} = 25 \text{ drops/minute}$$

Tubing/fluid/site change information

According to CCH policy, change:

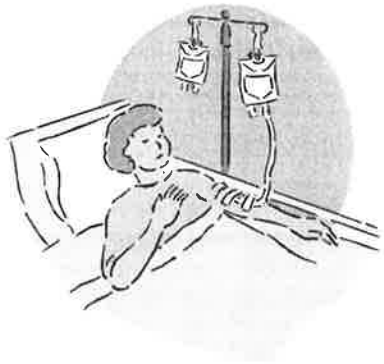
- IV fluids every 24 hours
- IV tubing every 72-96 hours

- IV catheter site every 72-96 hours
- Secondary tubing every 24 hours
- IV dressing every 72-96 hours, or when loose, soiled, or damp

Complications of Peripheral IV Therapy

Complication	Signs/Symptoms	Treatment	Prevention
Hematoma	-Ecchymoses -Swelling -Inability to advance catheter -Resistance during flushing	-Remove catheter -Apply pressure with 2 X 2 -Elevate extremity	-Use indirect method of veni-puncture -Apply tourniquet just before venipuncture
Thrombosis	-Slowed or stopped infusion -Fever/malaise -Inability to flush catheter	-Discontinue catheter -Apply cold compress to site -Assess for circulatory impair-ment	-Use pumps -Choose microdrip sets with gravity flow if rate is below 50 ml/hr -Avoid flexion areas
Phlebitis	-Redness at site -Site warm to touch -Local swelling -Pain -Palpable cord -Sluggish infusion rate	-Discontinue catheter -Apply cold compress initially; then warm -Consult physician if severe	-Use larger veins for hypertonic solutions -Choose smallest catheter appropriate -Use good hand hygiene -Add buffer to irritating solutions -Change solutions and containers every 24 hrs -Rotate infusion sites every 72-96 hours
Infiltration (extravasation)	-Coolness of skin at site -Taut Skin -Dependent edema -Backflow of blood absent -Infusion rate slowing	-Discontinue catheter -Apply cool compress -Elevate extremity slightly -Have antidote available	-Stabilize catheter -Place catheter in appropriate site -Avoid antecubital fossa
Local Infection	-Redness & swelling at site -Possible exudates -Increased WBC count -Elevated T lymphocytes	-Discontinue catheter and culture site and catheter -Apply sterile dressing over site -Administer antibiotics if ordered	-Inspect all solutions -Use sterile technique during venipuncture and site maintenance
Venous Spasm	-Sharp pain at site -Slowing of infusion	-Apply warm compress to site -Restart infusion in new site if spasm continues	-Take thorough history -Verify allergies -Use proper patient identification -Warm solutions with appropriate warming device if appropriate
Septicemia	-Fluctuating temperature -Profuse sweating -Nausea/vomiting -Diarrhea -Abdominal pain -Tachycardia -Hypotension -Altered mental status	-Restart new IV system -Obtain cultures -Notify physician -Initiate antimicrobial therapy as ordered -Monitor patient closely	-Use good hand hygiene -Carefully inspect fluids -Use Luer-Loks -Cover infusion sites with appropriate dressings -Follow standards of practice related to rotation of sites/hang time of infusions -Use appropriate preparation solutions
Fluid Overload	-Weight gain -Puffy eyelids / edema -Hypertension -Changes in I & O -Shortness of breath -Crackles in lungs -Distended neck veins	-Decrease IV flow rate -High Fowler's position -Keep patient warm -Monitor vital signs -Administer oxygen -Use microdrip set	-Monitor infusion -Maintain proper rate -Monitor I & O -Know pt's cardiovascular - history -Do not "catch up" infusion behind schedule
Air Embolism	-Lightheadedness	-Call for help!	-Remove all air from admini-

	-Dyspnea, cyanosis, tachypnea Wheezes, cough -Chest pain, hypotension -Changes in mental status	-Trendelenburg position -Administer oxygen -Monitor vital signs -Notify physician	stration sets -Use Luer-Loks -Attach piggyback to appropriate port
Speed Shock (adverse reaction to IV fluids or medications being administered too quickly)	-Dizziness -Facial flushing -Headache -Tightness in chest -Hypotension -Irregular pulse -Progression of shock	-Call for help! -Give antidote or resuscitation medications	-Reduce the size of drops by using microdrip set -Use electronic infusion device (EID) -Monitor infusion sites -Dilute IV push medications if possible, give slowly
Catheter Embolism	-Sharp sudden pain at IV site -Rough, uneven catheter noted on removal -Chest pain -Tachycardia	-Apply tourniquet above elbow -Contact physician -Start new IV -Measure remainder of catheter	-Use radiopaque catheters -Do not apply pressure over site -Avoid joint flexions -Never reinsert stylet that has been removed from sheath



Proper IV administration should follow the five "rights" of medication administration to avoid medication errors: be sure it is the right patient, the right drug, the right dose, the right time, and the right route before giving any medication.

The IV line must be intact before any IV medication can be administered. Some IV medications can cause severe tissue damage if injected into the tissue through an infiltrated IV site.

The drug delivery rate is an important factor when administering IV medication. Some IV drugs are meant to be delivered rapidly over several minutes to obtain therapeutic effect. Other drugs are most effective when delivered slowly and intermittently throughout the day. Each drug delivery rate is unique. Administration guidelines for giving IV medications must be followed to achieve the therapeutic effect desired. You may consult a Nursing Drug Handbook or PDR for information.

IV drugs may not be compatible with certain IV fluids or other drugs. Drug incompatibility is a true risk to the patient because it can cause crystallization of the medication that may at the least clog the IV line or at the worst have an embolus effect on the patient. Be sure to check compatibility warnings that are included in IV drug administration guidelines. The line must be flushed with saline before and after giving medications IV to avoid contact of incompatible solutions or medications.

The effects of medication appear rapidly after an IV injection. You must be aware of the indications, actions, and adverse effects of the medication that is to be delivered and must observe the patient closely for adverse medication reactions or allergic reactions and be prepared to respond with supportive therapy or drug reversing agents.

In order to increase the shelf life of a product, medication may be produced by the manufacturer in dry powder form (constituted). Most medications at CCH are mixed by the pharmacy, or are in the Add-vantage medication mixing system.

There are reconstitution systems that enable the health care provider to reconstitute a powdered drug and place it into an IVPB bag without using a syringe. Some medication vials are constructed with a spike that is used with a bag of fluids. When the bag is squeezed, fluid is forced into the vial, dissolving the powder. The system is then placed in a vertical configuration with the vial on top and the IVPB bag on the bottom. The IVPB bag is then squeezed and released, thereby creating a negative pressure, which allows the newly reconstituted drug to flow into the IVPB bag. Another reconstitution device is the ADD-Vantage system, which employs an IV bag containing intravenous fluid. The bag is designed with a special port, which will accept a vial of medication. When the vial is placed into the bag port, the contents of the vial and the fluid mix to form the desired solution.

For medications that must be mixed after pharmacy hours, aseptic technique must be used. Sterility of the needle must be maintained and ports must be cleaned with alcohol swabs. Medication must be mixed with the proper fluid in the designated area of the med room, with the mixing tray being cleaned after each use.