CAREPATHrx™
Specialty Pharmacy & Infusion Solutions

BLOOD SAMPLING

Section: Nursing
Compliance: ACHC Infusion Pharmacy
ACHC Standards: N/A
URAC Standards: N/A
TJC Standards: NPSG.01.01.01 EP 1, 2
Policy ID: NUR006
Effective: 1/1/21
Reviewed: 5/1/21, 5/1/22, 11/15/24
Revised: 9/1/21, 11/15/2024
Approved by: Kathleen Patrick, President, 1/1/21, 9/1/21, 5/1/22, 11/15/24

I. POLICY SCOPE

To ensure consistent techniques for drawing blood all nurses or appropriately trained and approved individuals such as a phlebotomist will perform blood drawing per procedure. The venous access condition and device should be evaluated prior to blood drawing to determine the appropriate site. Needleless blood transfer devices should be used whenever possible. At least three patient identifiers will be used when collecting blood samples for clinical testing. All specimens will be properly labeled at the time of collection. Blood conservation techniques for blood sampling will be used to reduce risk of anemia.

II. NURSING OVERVIEW

A. Educate patient/client/caregiver on purpose and process of blood sampling.

B. Exercise and upright position can alter plasma volume because of the force of gravity on venous hydrostatic changes and distribution of body fluids which change cell count values (i.e., hemoglobin, hematocrit, etc.). [1]

1. Patient to avoid exercise for 24 hours before blood sampling
2. Patient to be in recumbent or seated position for blood sampling.

C. Assess correct timing of blood sampling (i.e., fasting, drug timing for peak/trough, etc.).

D. Confirm all provider ordered laboratory testing is drawn to minimize blood volume wasted and collected.

E. Standardized procedure to be carried out by competent clinicians to ensure minimal rejected samples and resulting errors due to preanalytical errors (i.e. hemolysis, clotting, contamination). Preanalytical errors delay treatment or alter laboratory values causing increased risk for patient patent harm and costs of care.

1. Patient identity

a. Verify patient identity
b. Sample container labeling accuracy and in the presence of the patient

c. Use correct collection tube (based on tube additive) for test required for specific laboratory processing blood sample

F. All specimens to be labeled with date, time, patient name, and DOB in the presence of the patient

G. All specimens are to be placed in a bag or container with a biohazard label and transported in the dirty area of the vehicle.

H. When drawing therapeutic drug levels:

a. Provide the drug name, dose, time of last infusion and time of specimen collection.
b. Attempt to draw specimen from a dedicated lumen if a dose adjustment will be based on test results. Variabilities in test result accuracy include medication properties, flush volume, device design, device material, and discard technique. When elevated test results occur when the specimen is drawn from the lumen administering medication, the patient to be assessed prior to dose adjustment and direct venipuncture may be necessary to recollect the drug level specimen.

I. Accuracy of coagulation values from a blood sample obtained from a heparinized CVAD are inconclusive due to many confounding variables. These include specific procedures used (e.g., waste/discard, push-pull), adherence of heparin to the catheter material and/or intraluminal biofilm, and discard volumes that could be detrimental to the patient. Elimination of heparin locking solution could make use of a CVAD

J. Sampling of blood from indwelling short PIVC produced results for complete blood count, blood chemistry, and coagulation studies that are not different from a direct venipuncture.

K. Accuracy of coagulation values from a blood sample obtained from a heparinized CVAD is inconclusive due to many confounding variables. These include specific procedures used (e.g., waste/discard, push-pull), adherence of heparin to the catheter material and/or intraluminal biofilm, and discard volumes that could be detrimental to the patient.

L. For un-accessed implanted port, refer to Nursing policy on Vascular Access Port Guidelines.

III. PROCEDURE

A. Venipuncture Blood Drawing:

If venipuncture must be performed on the extremity with an infusion, use a vein below or distal to the site of infusion. Avoid venipuncture on the side of an axillary node dissection and in upper extremities with lymphedema, compromised circulation, or affected by radiation therapy or paralysis/hemiparalysis. When possible, restrict venipuncture to the dorsum of the hand in a patient with an actual or planned dialysis fistula or graft.
Avoid use of a tourniquet, if possible. If a tourniquet is necessary, apply it 2" (5 cm) proximal to the area chosen for the venipuncture; limit tourniquet time to less than 1 minute
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1. Supplies:

a. Vacutainer and needle or butterfly needle or syringe with needle
b. Alcohol swabs

c. Tourniquet
d. Blood collection tubes
e. Gloves
f. 2 - 2x2 gauze pad/Band-Aid
g. Plastic specimen bag
h. Labels/slips

2. Explain procedure and purpose to the patient or caregiver

3. Clean and disinfect work area using an appropriate disinfectant.

4. Perform hand hygiene (refer to **Infection Control policy: *Hand Hygiene***)

5. Gather supplies on a clean, disinfected, aseptic field.

6. Don gloves

7. Apply tourniquet and evaluate veins for appropriate venipuncture site. Tourniquet should be applied with enough pressure to stop venous flow but not arterial flow. If no pulse is palpable, the tourniquet is too tight. (Antecubital veins are most often used). Remove tourniquet after vein selection.

8. Clean selected site with alcohol in a circular motion from center to outside. Allow to dry

9. Obtain specimen using aseptic technique - Vacutainer method:

   a. Attach a double-ended needle or butterfly needle to vacutainer sheath, using the smallest gauge possible to achieve ordered results
   b. Re-apply the tourniquet above selected site being sure not to contaminate it.
   c. Have proper blood specimen tube resting inside vacutainer, but do not puncture rubber stopper
   d. Remove needle cover from vacutainer needle
   e. Grasp patient's arm below the selected site with thumb or forefinger of non-dominant hand and pull skin taut. Stretch skin down until vein is stabilized.
   f. Hold vacutainer at 15 to 30-degree angle from arm with bevel up. (Do not push tube past vacutainer holder before venipuncture because this will cause collection tube to lose its vacuum).
   g. Slowly insert the needle into vein.
   h. Grasp vacutainer sheath securely and advance specimen tube into needle of holder. **Do not advance needle into vein**
   i. After the specimen tube is filled, grasp the vacutainer firmly and remove tube from sheath. Insert additional specimen tubes as needed. The general order of labs is:

      1) Blood culture
      2) Coagulation studies (i.e. blue top)
      3) Serum (i.e. red/speckled top)
      4) Heparin tubes (i.e. green top)
      5) EDTA (i.e. lavender top)
      6) Oxalate/fluoride (i.e. grey top)

   j. After the last specimen tube is filled and removed from sheath, release the tourniquet

k. Apply a 2x2 gauze pad or alcohol swab over venipuncture site without applying pressure and quickly but carefully withdraw needle from the vein.

l. Immediately apply pressure over the venipuncture site with gauze for 2 to 3 minutes, or until the bleeding stops. Secure gauze over site with tape or band aid.

m. Dispose of needle in the appropriate container

n. Only one device should be utilized for each attempt.

o. Verify specimen is labeled with date, time, patient name in the presence of the patient & DOB before transport to laboratory

NOTE: Accuracy of coagulation values from a blood sample obtained from a heparinized CVAD are inconclusive due to many confounding variables. These include specific procedures used (eg, waste/discard, push-pull), adherence of heparin to the catheter material and/or intraluminal biofilm, and discard volumes that could be detrimental to the patient. Elimination of heparin locking solution could make use of a CVAD

B. Central Line Blood Draw (Hickman, Groshong, PICC, and accessed implanted port.):

1. Supplies needed:

    a. Normal saline for flushes, 10-20 ml
    b. Heparin, as ordered by physician, for flush (except for Vacutainers)
    c. Vacutainer needle or if using needleless system multiple luer adapter and syringe cannula
    d. Injection cap, if necessary
    e. Blood collection tubes
    f. Alcohol swabs
    g. Plastic specimen bag
    h. Gloves
    i. Needles and syringes (5 ml & 10 ml)

2. Explain procedure to patient or caregiver

3. Clean and disinfect work area using an appropriate disinfectant.

4. Perform hand hygiene (refer to **Infection Control policy: *Hand Hygiene***), and don gloves.

5. Gather supplies on a clean, disinfected, aseptic field

6. If drawing specimen while IV solution is infusing or when venous access is being used for medication administration:

    a. Stop infusion

    b. Cleanse injection cap with alcohol swab using vigorous friction to hub for 30 seconds and allow to dry for 60 seconds.

    c. Follow the steps below

    d. Start infusion again.

NOTE: It is recommended that blood not be drawn from a catheter if TPN is infusing

7. Remove injection cap with lumen hub cleaning in accordance with **Nursing Policy: *Cap and Dressing Change*.**

8. Attach male leur lock vacutainer directly to catheter lumen hub.

9. Insert red top tube into vacutainer, fill halfway with blood and discard in sharps container

10. Obtain blood specimen in appropriate tubes and withdraw vacutainer needle/syringe cannula

11. Clamp catheter if required

12. Cleanse junction and lumen hub threads with alcohol swab for 30 seconds and allow to dry. Change injection cap in accordance with Nursing Policy on Dressing and Injection Cap Change.

13. Flush catheter with appropriate flushes per provider order. Refer to Nursing policy on Flushing and Locking Catheters.

14. Dispose of all sharps in appropriate container

C. Syringe Method Blood Draw from Central Venous Catheters (Hickman, Groshong, accessed implanted port, PICC)

1. Supplies needed

   a. Alcohol Swabs/wipes
   b. 10 ml syringe
   c. 1- syringe equal to the amount of required blood specimen
   d. Saline flushes appropriate for catheter type
   e. Heparin flushes appropriate for catheter type
   f. Injection cap
   g. Specimen tubes
   h. 20-gauge or 18-gauge needle
   i. Gloves
   j. Plastic specimen bag
   k. Sterile 2X2 gauze

2. Explain procedure to patient/caregiver

3. Wash hands, gather and prepare supplies on a clean, dry surface, don gloves

4. If drawing specimen while IV solution is infusing or when venous access is being used for medication administration:

   a. Stop infusion
   b. Cleanse injection cap with alcohol swab using vigorous friction to hub for 30 seconds and allow to dry for 60 seconds.
   c. Follow the steps below
   d. Start infusion again.

NOTE: It is recommended that blood not be drawn from a catheter if TPN is infusing

4. Clamp the catheter
5. Remove injection cap in accordance with Nursing Policy on Dressing and Cap Change.
6. Connect Syringe to lumen hub
7. Unclamp catheter and withdraw blood waste (5-7 ml for adult, 3-5 ml for pediatrics).
8. Clamp the catheter and remove the syringe from the catheter, and discard waste.
9. Attach syringe for specimen collection and unclamp catheter. Withdraw desired amount of blood.
10. Clamp catheter, remove syringe and attach normal saline flush. Unclamp catheter and flush with normal saline.
11. Attach blood transfer device to syringe and fill specimen tube(s). Discard syringe and blood transfer device after specimen tube(s) are filled.
12. Clamp patient's catheter and remove normal saline syringe
13. Replace injection cap in accordance with Nursing Policy on Dressing and Cap Change.
14. Cleanse injection cap with alcohol wipe for 30 seconds and allow to dry for 60 seconds. Unclamp catheter and flush with heparin, clamping during the last 0.5 ml flush. Remove heparin syringe, maintaining positive pressure on plunger and discard.
15. Discard all syringes and sharps in an appropriate container

D. Documentation to include:

1. Date, time, patient name, and DOB on blood sample tubes
2. Procedure used to collect blood
3. Number of venipuncture attempts, as applicable
4. Location the lab specimen was sent for processing
5. If drawing a drug level, the time of the last dose.

E. Training

This policy will be posted on the Company shared drive.

APPENDIX A
LAB TEST GUIDELINES:

Order of Draw	Stopper Color	Additive	Number of inversion s
1	Blood Culture bottles	Growth Medium	8-10
2	Light Blue	Citrate	3-4
3	Gold	Gel, serum	5
4	Red	No gel, serum	5
5	Green or Tan	Heparin	8-10
6	Lavender or Tan	EDTA	8-10
7	Royal Blue	EDTA	8-10
8	Gray	Sodium Fluoride	8-10
9	Yellow	Citrate ACD	8-10

- Red Tops: No gel:
  1. Keep at room temperature for 30 minutes to form clot (do not exceed 60 minutes)
  2. To prevent clots, spin within 10-15 minutes

LAB TEST	TUBE COLOR	Number of inversions	STABILITY
Blood Culture	Blood Culture Bottles	8-10	48 hours at room temperature
Coagulation Studies: Pro-time, prothrombin time	Light blue top	4	24 hours at room temperature. *Do not ice, refrigerate or freeze*
Drug levels, any titers, cross match, magnesium/serum chemistry	Red top (no gel)	5 – plastic 0 – glass	Varies, check with the laboratory. Typically: 3-5 days room temp 7 days refrigerated
Serum Chemistry: CORVAC, all chemistries, magnesium	Serum separator / Tiger Top (red/gray/marble)	5	72hours room temperature or refrigerated. Specimen may need spun immediately for stability, check with laboratory.
Plasma Chemistry: Ionized Calcium	Green, light green or gray top w/ Heparin	8-10	Ionized Ca has 45 min from vein to centrifuge stability. Call laboratory: may need to be on ice and/or protected from light (wrapped in foil)
CBC, differential, platelets, sedimentation rate, cross match	Purple top	8-10	48 hours room temp or refrigerated. For sed rate, 24 hours at room temperature and must be collected in a separate tube.
Glucose, (fasting & 2 hr. post prandial)	Gray top w/ sodium fluoride	8-10	24 hours room temp 72 hours refrigerated Serum & plasma must be separated from cells for stability

PEDIATRIC TUBES:	TUBE COLOR	Number of inversions	STABILITY
CBC, differential, platelets, sedimentation rate	Purple top		1 day at room temperature. Sed rate; 12 hours
Chemistries, titers	Red top		If able to spin, do so. If unable to spin, process within 12-24 hours. Refrigerate if duration is long.

**NOTE: Blood cultures should always be drawn before others specimen tubes. Refer to CarepathRx policy on *Blood Culture Collection*.

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