
Continuing Education
Material:

**ROUTINE
VENIPUNCTURE:**

Review of CLSI Guideline GP41, 7th Edition 2017

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ABP CONTINUING EDUCATION MATERIAL

ROUTINE VENIPUNCTURE

OBJECTIVES

1. Outline the steps in a routine venipuncture
2. Discuss changes in the April 2017 guideline

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This continuing education material, ROUTINE VENIPUNCTURE, will earn the participant 1.0 contact hours. If you have any questions regarding this information or would like further information on other continuing education opportunities, please contact:

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PROCEDURES FOR THE COLLECTION OF DIAGNOSTIC BLOOD SPECIMENS BY VENIPUNCTURE CLSI Document GP41, 7th edition, April 2017

Significant changes in the 2017 guideline include:

- Greater detail on patient ID, specimen labeling, patient positioning, collecting from mastectomy patients, tourniquet use, adverse reactions, needle relocation, prioritizing veins in the antecubital area, and preventing iatrogenic anemia
- Changes to what constitutes acceptable venipuncture sites
- Significant revision of the information on collecting specimens from vascular access devices and during infusions
- Information on trace elements tubes in regards to the order of draw
- Comprehensive sections on remedies for difficult collections
- Updated references

BLOOD SPECIMEN COLLECTION PROCESS

1. Patient is registered
2. Collection test request is received
3. Patient is approached and greeted
4. Patient is identified
5. Pre-collection requirements are assessed
6. Hands are cleansed
7. Patient is assessed
8. Patient is positioned
9. Specimen is collected
10. Specimen is labeled
11. Post venipuncture care is provided
12. Specimen Handling & Transport Process

STEPS IN THE VENIPUNCTURE PROCEDURE

Practice “standard precautions” with each patient – universal precautions and body substance isolation (BSI).

1. **Patient is registered and Collection Test Request is Received**

Regardless of the setting, the following information must be obtained or verified: full name, date of birth and sex, full address, proof of ID (government issued card with photo or other photo ID card). A patient specific identifier, DOB or medical record number must also appear on patient ID band and/or labels. All test requests must be checked for completeness and any discrepancies resolved prior to collection.

2. **Approach and identify the patient; sanitize hands**

Greet the patient, identify yourself and make sure to obtain proper consent before performing the venipuncture. Proper patient identification is crucial. Outpatients should be asked to **state and spell** their full name, address and birthdate. Inpatients should be asked to state their full name and that information should be compared to the information on the patient’s identification bracelet. For inpatients the unique identification number will be the medical records number on the armband. Any discrepancy must be resolved before drawing the patient. Inpatients must have ID bands affixed to their person. A nurse or relative should identify a patient who is unconscious, too young, cognitively impaired or does not speak the language of the phlebotomist. A three part identification system is recommended for use in identifying unknown emergency room patients. A

name and/or unique identification number should be attached to the patient's body. Bed labels or armbands taped to the beds are not an acceptable substitute for one attached to the patient. Phlebotomists are instructed to "sanitize" their hands in accordance with the CDC Hand Hygiene Guidelines which allow for the use of alcohol sanitizers between patients.

3. Precollection Requirements: Verify patient's diet restrictions, any medication time constraints, any complications related to blood draws, i.e. history of fainting, allergies

Some tests require the patient to fast and/or eliminate certain foods from the diet prior to a blood draw. Ask the patient what time and what foods they last had to eat. Time and diet restrictions vary according to the test. Usual fasting is 8-12 hours without anything to eat or drink except water. Follow the procedure at your facility. Ask the patient about any sensitivity to latex to avoid severe hypersensitivity and/or an anaphylactic reaction to gloves, tourniquets or bandages, if any latex supplies are used. Any patients with a history of fainting must be drawn in a recumbent (lying down) position.

4. Assemble necessary supplies and put on gloves

The ETS (evacuated tube system) is the preferred method of blood collection because it allows the blood to pass directly from the vein into the evacuated tube. It is the safest and most efficient way to collect blood by venipuncture. A syringe may be used for small or difficult veins but a syringe safety transfer device must be used to transfer the blood to the blood collection tube. A winged infusion set may also be used for small or difficult veins but must have a tube holder or a syringe attached before use. Gloves may be put on at any point in the procedure as long as they are on before the actual venipuncture occurs. Do not preassemble equipment prior to patient identification.

5. Reassure and position the patient

Never tell the patient that the procedure will not hurt. Follow your facility's policy regarding information given to the patient about test being drawn. The patient always has the right of refusal. The seated patient should position his arm on the slanted armrest and/or extend the arm to form a straight line from the shoulder to the wrist. Never draw a standing patient due to safety issues from fainting. For a lying down patient, a pillow or towel may be used to support the arm in a similar position. Always have a patient with prior history of fainting lie down or recline for the procedure. No food, liquid, gum or thermometer should be in the patient's mouth, especially children, at the time the specimen is drawn to prevent aspiration and possible choking.

6. Verify paperwork and the selection of tubes

The phlebotomist is responsible for verifying that the identification number on the requisition matches the number on the patient's bracelet and that the correct tubes are available before sticking the patient.

7. Apply the tourniquet

A tourniquet is used to increase intravascular pressure to help with vein palpation. The tourniquet should be placed 3-4 inches above the venipuncture site. Leaving the tourniquet on for more than one minute can cause hemoconcentration and erroneous results for certain analytes. If the tourniquet has been on for more than one minute, it should be released and reapplied after two minutes. A blood pressure cuff may be used as a tourniquet but should not be inflated to more than 40-60 mm HG or below the patient's diastolic pressure. Veins may become more permanent if the patient makes a fist. There must be no vigorous pumping which can cause hemolysis or hemoconcentration of certain analytes in the blood. Single use tourniquets are recommended to prevent the spread of MRSA and other healthcare acquired infections.

8. Select the venipuncture site

The median cubital vein, located in the middle of the antecubital fossa, and the cephalic vein, located on the thumb side of the antecubital fossa, are the first and second choices because they

are the largest and fullest veins and do not lie near any major arteries or nerves in the antecubital fossa. The third choice is the basilic vein, which lies on the little finger side of the antecubital fossa and also very close to or on top of the brachial artery. Veins on the back (dorsal) side of the hand are also acceptable. Veins on the palmar or underside of the wrist are not acceptable since there are nerves and tendons close to the surface of the skin in this area. Alternative sites such as ankles or arteries are not to be used except with physician permission because of the potential for medical complications such as phlebitis, thrombosis or tissue necrosis. A physician must provide written permission before a venipuncture is performed on the side on which a mastectomy has been performed because of the potential for complications to lymphedema.

Pictures of the antecubital area refer to vein arrangements as the “H-shaped” and “M-shaped” patterns. The H pattern is named because the cephalic, median and basilic veins are distributed on the arm in a way that resembles a slanted H. The H pattern is seen in about 70% of the population. In the M pattern, the cephalic, median cephalic, median basilic and basilic veins resemble the shape of an M. Always consider the median and cephalic veins on both arms before choosing the basilic vein. Full color pictures are included in the standard. Use the middle or index finger to palpate for veins. Do not use the thumb since it has a pulse and may cause confusion.

9. **Cleanse the venipuncture site**

Use a gauze pad with 70% isopropyl alcohol or a commercially prepared alcohol prep pad to cleanse the site. Cleanse the site in a circular motion from the center to the periphery. It is now acceptable to use a friction back and forth scrub to clean the site. The site must be allowed to air dry to prevent the patient having a burning sensation, to prevent hemolysis of the specimen and to allow for the optimal antiseptic effect of the alcohol. **Follow your facility protocol for site cleansing.**

Proper skin antisepsis for blood culture collection is essential. Traditional skin prep requires the use of 70% isopropyl alcohol and iodine. Tincture of iodine, multiple isopropyl preps, chlorhexidine gluconate, and povidone iodine/70% ethyl alcohol combinations are equivalent. Follow the manufacturer's directions when using a commercial prep kit. The use of chlorhexidine gluconate is not recommended for use on infants less than two months of age.

10. **Perform the venipuncture using the correct order of draw**

Inspect the needle to make sure that the seal is intact. Check the tip of the needle for any hooks, burrs or small particles that could obstruct blood flow, injure the patient or get into the patient's blood stream. Make sure that tubes are not expired or cracked. Hold the patient's arm distal to the venipuncture site and pull the skin taut about 1 to 2 inches below the puncture site by using the thumb to anchor the vein. Anchoring should not impede needle insertion or increase the angle of insertion. Do not anchor above the site as this increases the risk of a needle stick accident. Insert the needle, bevel up at a 15-30 degree angle between the needle and the skin. Make sure that the patient's arm is in a downward position to prevent reflux or backflow.

The order of draw for blood collection using the ETS, syringe or butterfly:

- 1) blood culture bottles and/or sterile yellow stopper tubes
- 2) coagulation tube (lt. blue stopper tube w/sodium citrate)
- 3) serum tubes with or w/o clot activator and with or w/o gel separator (red stopper, glass or plastic; SST, gold, red-black marbled)
- 4) heparin tube with or w/o gel separator (green or lt. green stopper)
- 5) EDTA tube (lavender or pearl white stopper)
- 6) oxalate/fluoride – Antiglycolytic tube (gray stopper)

Red (glass) non-additive tubes may still be drawn after the blood culture or yellow tubes and before the lt. blue coagulation tubes. It is important to remember to draw the red (plastic) tubes after the lt. blue coagulation tubes. Get separator tubes with clot activators are classified as

additive tubes. These tubes should be drawn after the lt. blue stopper tube and before the other additive tubes – green, lt. green, lavender and gray – to avoid possible test errors due to cross contamination from tube additives. The concentration of sodium in sodium citrate and sodium heparin tube has not been proven to alter the sodium concentration in tubes that follow should carryover occur.

Trace elements in blood collection equipment may contaminate the specimen with trace elements from their components. It can vary with the trace element being measured. Follow manufacturer instructions. A syringe must not be used for collections that include testing for cobalt and chromium because the plunger tip contributes such elements to the specimen.

Each tube that contains an additive should be mixed **immediately** after drawing to prevent microclot formation. For multiple tube collections the prior tube can be mixed while the next one is filling. Follow manufacturer's instructions for the required number of inversions.

NOTE: If only a coagulation tube is to be drawn for routine testing – PT or APTT – the first tube drawn may be used for testing. For special coagulation testing – factor assays – the second or third tube should be used. When use a winged infusion set (butterfly), a discard or clear tube (non-additive red glass or another coagulation tube) must be drawn first to fill the dead space in the tubing with blood to prevent under filling of the testing tube and thus erroneous test results.

If the patient complains of a shooting, electric-like pain, tingling or numbness proximal or distal to the puncture site, terminate the venipuncture immediately and remove the needle. Make sure to document according to your facility's protocol.

Instruct patient to open his hand, unless it is felt that doing so would cause the vein to collapse. Do not allow the patient to pump his hand.

11. Release and remove the tourniquet

The tourniquet should be released as soon as the blood begins to flow to minimize hemoconcentration unless it is felt that doing so would cause the vein to collapse.

12. Place gauze, remove needle, activate safety device and dispose of needle assembly as a unit

Make sure that the patient's hand is open to reduce the amount of venous pressure before removing the needle. The needle should be removed using the same angle of entry. Place a gauze pad over the puncture site, taking care not to press down until the needle has been removed. Cotton balls are not recommended because of the little hair-like fibers that could clump and interrupt platelet plug formation when removed. Apply direct pressure to the site without bending the arm. Bending the arm promotes bruising. Make sure safety device has been activated and discard needle assembly in a sharps container.

13. Check for active bleeding and the bandage

Perform a two-point check for active bleeding prior to bandaging. The patient should leave the bandage on for at least 15 minutes. If the patient is not on anticoagulation therapy and bleeding persists for more than 5 minutes, notify the doctor or nurse.

14. Label the tubes and record the time of collection

The label on the tube must contain the following minimum requirements:

- The patient's first and last name
- A unique identification number
- The date, time and identification of the person collecting the specimen

Labels must be attached to the tube(s) before leaving the patient's bedside or before the patient leaves the drawing room. The labeled tube must be compared to the patient's identification armband for in-patients or have the outpatient verifies that the information on the labeled tube is

correct prior to leaving the drawing room.

15. Observe any special handling requirements

Some specimens require cooling in ice slurry to slow down metabolic processes (lactic acid and ammonia), transportation at body temperature of 37° to prevent precipitation or agglutination (cold agglutinin) and/or protection from light to prevent analyte breakdown (bilirubin).

16. Send blood collection tubes to the proper laboratories

SYRINGE METHOD

The venipuncture procedure is essentially the same. When assembling the needle and syringe, break the seal of plunger in the barrel by pulling back gently. Make sure that all the air is expelled prior to use. Activate the needle safety device. Remove and discard into sharps container and apply a safety transfer device to the syringe. Using the same order of draw, insert the first tube to be filled. Allow the tubes to fill without applying any pressure to the plunger. The tube will fill until the vacuum is used.

MISCELLANEOUS

- It is not recommended that venipuncture be attempted more than twice. If two people have each made two attempts, it is time to contact the physician.
- Gel separator tubes must not be used for blood bank specimens.
- Certain tests may require timed collections: glucose, cortisol, hormone levels, coagulation tests and drug levels.
- Make sure to use a non-alcohol based antiseptic to clean the venipuncture site prior to collecting a blood alcohol.
- For collecting specimens for trace elements, use a metal-free container.
- Do not draw any blood from an arm that contains a fistula used for dialysis.
- never draw blood from a site above an IV. Avoid collecting blood from a previously active IV site for at least 24 to 48 hours after the IV is discontinued to avoid potential test errors.
- The use of ammonia inhalants may be associated with adverse effects (asthma attack) and is not recommended.
- A mechanism should be in place to monitor the amount of blood drawn from pediatric patients, geriatric patients and critically ill patients to avoid having phlebotomy induced anemia.
- CLSI guidelines recommend that most routine specimens be processed within 2 hours from time of collection.

REFERENCES:

CLSI: Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard, GP41-7th Edition; Volume 37, Number 7; April 2017.

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Routine Venipuncture – Self-Assessment Quiz

**Please place all answers on the Continuing Education Registration Form.
Mail form to ABP LLC to be graded so that you can get your P.A.C.E. certificate.**

1. Which of the following is NOT a correct way to identify a patient?
 - a. Are you Mr. Sam Jones?
 - b. Compare the medical records number on the requisition with the patient's armband.
 - c. Ask the patient to state and spell his name.
 - d. Ask a nurse or relative to identify an unconscious patient.

2. Patient identification can be confirmed by using the information taped to the patient's bed.
 - a. True
 - b. False

3. Which of the following statements is NOT correct?
 - a. Warn the patient prior to inserting the needle.
 - b. Ask the patient what time he last had anything to eat or drink except water.
 - c. Allow a child to drink milk during the procedure.
 - d. Support the patient's arm with a towel during the procedure.

4. About 70% of the population has a vein arrangement in the shape of the letter:
 - a. M
 - b. H
 - c. N
 - d. W

5. Which of the following should NOT be done during venipuncture site preparation?
 - a. Use 70% isopropyl alcohol for cleansing.
 - b. Use a clean gauze pad to wipe off the alcohol prior to inserting the needle.
 - c. Clean in a circular motion from inside to outside.
 - d. Prepare the gloved finger in the same manner before retouching the prepared site.

6. Leaving the tourniquet on the arm for longer than one minute can result in:
 - a. Hemoconcentration
 - b. petechiae
 - c. bruising
 - d. nerve damage

7. The correct order of draw when using the evacuated tube system:
 - a. SST, Lt. Blue, Green, Lavender, Gray, Red
 - b. Lt. Blue, Red, SST, Lavender, Green, Gray
 - c. Lt. Blue, Red, SST, Green, Lavender, Gray
 - d. Red, Lt. Blue, SST, Lavender, Green, Gray

8. It is important to remove the needle, after activating the safety device, prior to discarding the holder.
 - a. True
 - b. False

9. Which of the following statements IS correct about specimen labeling and transport?
 - a. Label the tubes after leaving the patient's room.
 - b. Have an outpatient confirm that the information on the labeled tube is correct before leaving.
 - c. Have the patient label his own tube to make sure the information is correct.
 - d. A test for a cold agglutinin should be kept chilled until tested.

10. Which of the following statements IS correct?
 - a. An ammonia level must be kept warm after collection and until testing.
 - b. Gel separator tubes may be used for Blood Bank.
 - c. Never collect blood above an IV site.
 - d. Use tincture of iodine to prepare the site for a blood alcohol collection.