VACUETTE® Blood Collection Techniques

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An Informative Guide to Blood Collection
Formal education and studies rarely cover blood collection technique in detail, even though this is an area which is often critically observed by patients. It is, therefore, of great importance that the best technique is applied in every situation.

Before taking a blood sample, it is extremely important to be fully familiar with the collection system being used. It will make an unprofessional impression to mishandle the blood collection equipment and make the patient feel increasingly anxious, which will have a negative influence on the condition of the veins.

This guide should help to quickly develop good phlebotomy technique, and avoid unnecessary errors. The required skills can only be obtained by consistent training and practice.

Equipment Required for Blood Collection

- VACUETTE® Blood collection system
- Tourniquet
- Disposable gloves
- Gauze pads
- Alcohol wipe
- Bandage
- Sharps container
Inspection

Before deciding on a puncture site, an inspection of all possible areas is imperative, checking both the right and left arms. The order of inspection should correspond to the list of priority sites, whereby the first and second sites should be suitable in most cases.

Vein Selection: Priority List

1. Median cubital vein
   Located in the center of the antecubital area - close to the skin. Large vein - easy to anchor - remains stationary during venipuncture. Least risk of injury.

2. Cephalic vein
   Located on the outer side of the antecubital area. Easier to anchor and less painful to puncture than the basilic vein.

3. Basilic vein
   Located on the inner side (medial) of the antecubital area. Use only when the other veins are unacceptable for a venipuncture procedure.
4. Dorsal hand veins

Acceptable secondary site if veins in the antecubital area of both arms are not viable.

Patient Identification

Prior to blood collection, the patient should state and spell his or her name and provide other identifying information. The response should correlate with the wristband and test requisition. If patient is unable to respond verbally, someone else must identify the patient; e.g., family member or nurse. The phlebotomist should record the name of the person identifying the patient.

The following information should appear on the blood collection tube label:
- Last name, first name
- Unique patient identification number
- Date and collection time
- Collector’s initials or other identifier

Measures to Improve Prominence of Vein

1. Incline the arm in a downward position
Measures to Improve Prominence of Vein continued

2. Clench the fist (do not pump)

3. Warm the area

Applying the Tourniquet

A standard tourniquet or blood pressure cuff is applied proximal to the anticipated puncture site.

Application of the tourniquet or blood pressure cuff should not cause the patient any pain. If a blood pressure cuff is used, it should be inflated to just below the patient’s diastolic pressure. Application of the tourniquet or blood pressure cuff should not exceed one minute to avoid altering laboratory results.
Applying the Tourniquet continued

If a longer application is required to locate the venipuncture site, then the tourniquet should be removed after 60 seconds and may be reapplied after two minutes have lapsed.

If the tourniquet has been applied too tightly, discoloration of the extremities may occur. The tourniquet should be released immediately until the skin returns to its normal color. The ideal application is as short as possible, and should not last longer than one minute. If the blood flow is insufficient for specimen collection, the tourniquet can be reapplied during the collection procedure.

Cleansing the Puncture Site

The puncture site should be cleansed thoroughly. The skin should be cleansed with an antiseptic solution, such as 70% isopropyl alcohol. For standard blood collection, reduction of bacteria in skin flora takes place after about 15-30 seconds* when an alcohol solution is used. Allow the area to dry completely.

It is obligatory to wear new disposable gloves for every venipuncture in accordance with standard precautions.

*If applicable, refer to the instructions for use for the antiseptic or cleaning method used.
Routine Puncture Sites

Puncture site: median antecubital veins

The antecubital space is the most popular site for venipuncture.

It is always worth taking time to inspect both arms, to be able to choose the arm with the most prominent veins.

If the patient has a particular preference for a puncture site, then this should be accommodated whenever possible.

It is of utmost importance that the patient is relaxed and sitting comfortably. The arm should be extended in a downward position.

The forefinger should be used to palpate the vein and to ensure the vein is appropriate for venipuncture. The area is then thoroughly cleansed.

Anchor the vein below the intended puncture site. This reduces the chance of veins moving as the needle is inserted.
The venipuncture is carried out at an insertion angle of less than 30 degrees with needle bevel up.

Use a steady advance until the needle bevel is in the lumen of the vein. Puncture depth varies depending on the patient and the vein utilized for collection.

Using the free hand, insert an evacuated tube into the holder. As soon as blood flow is established, the tourniquet should be released to minimize hemoconcentration. Unnecessary hand changes should be avoided. Any unnecessary movements within the vein may cause additional pain.
Routine Puncture Sites continued

Puncture site: Dorsal hand veins

Grasping the patient’s hand for venipuncture, pull the skin in a downward direction until taut.

The needle or blood collection set is inserted into the middle of the targeted vein, at an angle of 10-20 degrees. As soon as the blood flow starts, the tourniquet can be released.

Factors Leading to Difficult Venipuncture

- Anxiety
- Cold
- Thin veins
- Vasoconstriction of veins
- Sclerosed veins
- Long term treatment with steroids
- Shock
- Poor hydration
- Small veins (children/women)
- Repeatedly punctured veins
- Cachexia

The above list of possible unfavorable factors is by no means complete. It is a well known fact that there are a number of adverse situations that can make blood collection difficult.
Helpful Hints for Blood Collection

After removing the rear protective cover, the double-ended blood collection needle is threaded into the holder. The front protective cap is removed before puncture. For hygienic reasons as well as to protect against exposure, gloves are required.

The blood collection equipment is held between the forefinger, middle finger and thumb.

The hand carrying out the venipuncture should not be swapped unnecessarily during the procedure. After penetrating the vein, the free hand is used to push the evacuated tube into the holder.

If the needle is in the correct position, blood flows into the tube. If there is no blood flow, it is likely that the needle tip is not in the vein lumen. Lightly pulling back or moving the needle slightly forward to correct the needle position can remedy this.

Factors Leading to Difficult Venipuncture continued

Every step that can lead to vasoconstriction in a patient is a hindrance. Comments such as “You’ve got bad veins” are not very helpful, and serve more to express helplessness of the blood collector. The first priority is to reduce the patient’s anxiety, which is the main cause of vasoconstriction. A calm atmosphere is of prime importance. A hectic environment, a cold room or personnel with cold hands can lead to vasoconstriction.

If a patient would prefer to lie down or if a particular venipuncture site is preferred, these wishes should be accommodated whenever possible.
Procedure After Blood Collection

Nothing is more unsightly than a bruise after blood collection. The phlebotomist is, to a certain extent, judged on successful vein penetration and the extent of any bruising afterwards.

This complication can largely be avoided. Before removing the needle from the vein, the tube is removed from the holder. The tourniquet should have previously been released.

Needle removal is followed by compression using a gauze pad.

If the compression is applied while the needle is being removed, the vein wall could be injured. This can lead to a large hematoma at the puncture site. The compression must be carried out directly after removing the needle. Taking normal coagulation time into account, 2-4 minutes time for compression is necessary to prevent a hematoma from forming.

If the patient is too weak, the phlebotomist should make sure that compression is adequately applied.

A sterile bandage should only be applied when compression is complete.

For patients undergoing anticoagulation therapy, good manual compression is essential.

Physical exertion should be avoided immediately following blood collection, as this could lead to formation of a hematoma.

Venipuncture With Small Children

Technically speaking, blood collection with children from 2 years and up is not that different from blood collection with adults.

The collection equipment must be suitable for the smaller dimensions of the vessels. Above all, a calm and friendly atmosphere is extremely important for young patients.

Children are far more cooperative if the procedure has been explained to them prior to collection.
Safety Aspects During Blood Collection

Due to the high risk of exposure, great care should be taken to ensure correct application of materials and equipment, taking particular care to avoid distractions or loss of attention.

Use of plastic tubes

By using thick-walled plastic tubes (PET) instead of glass, the risk of tube breakage and thus injury due to glass shards is virtually eliminated.

**VACUETTE**® **QUICKSHIELD** Safety Tube Holder

When using the **VACUETTE**® **QUICKSHIELD** Safety Tube Holder, blood collection is carried out as usual. When the last tube has been filled, withdraw the needle carefully from the vein.
With the aid of a solid surface or using the thumb to activate the safety shield, the needle is enclosed by the protective shield attached to the holder.

An audible “click” signifies to the user that the safety shield has been properly activated.

**VACUETTE® Safety Blood Collection Set**

After using the safety blood collection set, the safety mechanism is activated as the needle is withdrawn from the patient’s vein.

After completion of blood collection, place gauze over the site and anchor the wing with one hand.

With the other hand, activate the safety mechanism by pressing in both sides of the hub to engage the lock. Slide the safety mechanism backward until an audible “click” is heard.
Complaints about incorrect laboratory values can usually be traced back to the blood collection procedure.

From the laboratory’s point of view, the stasis resulting from extended tourniquet application should always be as short as possible to avoid altered test results.

Prolonged stasis can have an effect on several values including proteins, cell counts, lipids and other protein bound substances.

Furthermore, excessive application of the tourniquet can lead to hemolysis.

To prevent potassium values from increasing, excessive manipulation of the veins, such as heavily tapping the veins, should be avoided.

Coagulation tubes should be fully inverted (180°) 4 times after filling, EDTA tubes 8-10 times and all others 5-10 times. To obtain the full effect of anticoagulants, a thorough mixing is necessary. The air bubble should move from one end to the other, and then back again, for a full inversion.

Incorrect blood collection from vascular access devices can lead to contamination from infusion solutions or dilution.

Clear labelling of samples with patient data is essential. Any labels attached should not block view of blood as it flows into tube. The tubes should be transferred to the laboratory immediately after blood collection.

**These guidelines are recommendations. Your facility protocol should be adhered to at all times.**
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Literature

1 Dörner, K., Böhler, T.: Diagnostische Strategien in der Pädiatrie, Darmstadt 1997


4 Dennis J. Ernst MT (ASCP), Catherine Ernst RN.: Phlebotomy for Nurses and Nursing Personnel, 2005