

# Blood sampling

## **INTRODUCTION**

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Blood collection is of most importance for medical analyses which are used in the diagnosis and prognosis of disease. The volume of blood and the site of puncture are determined according to the analysis type and the number of analyses. The samples should be treated or not according to the type of test. Generally the main types of blood sampling are arterial sampling, venipuncture sampling and fingerstick sampling the most common one of these is the venipuncture sampling.

### **A. Venipuncture sampling**

#### **1. Principle.**

Venipuncture is the most common way to collect blood from adult patients. Collection takes place from a superficial vein in the upper limb, generally the median cubital vein, this vein is close to the skin and doesn't have many large nerves positioned close by. This reduces pain and discomfort for the patient. Venipuncture can take place in a general medical practitioner's office and is often carried out by a trained phlebotomist or nurse. This type of sampling is the most common for biochemical tests.

#### **2. Procedure.**

1. Position the patient in a chair.
2. Wash your hands.
3. Select a suitable site for venipuncture, by placing the tourniquet 10 to 15 cm above the selected puncture site on the patient.
4. Do not put the tourniquet on too tightly or leave it on the patient longer than 1 minute.

5. Palpate the vein. When a vein is selected, cleanse the area by alcohol in a circular motion, beginning at the site and working outward. Allow the area to air dry. After the area is cleansed, it should not be touched or palpated again. If you find it necessary to reevaluate the site by palpation, the area needs to be re-cleansed before the venipuncture is performed.
6. Ask the patient to make a fist and avoid pumping the fist.
7. Hold the patient's arm firmly using the thumb to pull the skin taut to anchor the vein. The thumb should be 1–2 inches below the venipuncture site.
8. Swiftly insert the needle through the skin into the lumen of the vein. The needle should form a 15-30 degree angle with the arm surface. When the needle enters the vein the blood ascends by capillary action into the needle to the plastic transparent region to be sure that the needle is inside the vein, at this point do not push the needle, ask the patient to open the fist, remove the tourniquet and pull the piston.
9. Remove the needle from the patient's arm.
10. Place gauze immediately on the puncture site. Apply and hold adequate pressure to avoid formation of a hematoma. After holding pressure for 1-2 minutes, tape a fresh piece of gauze.

**Note**

Pumping the fist to enhance blood flow leads to an increase in  $K^+$  and  $Mg^{+2}$  due to increased muscle activity. This leads to a false increase in the determination of  $K^+$  and  $Mg^{+2}$  levels.

**Note**

Do not leave the tourniquet on the patient's arm longer than 1 minute because prolongation of tourniquet application may produce erroneous test results.

**Note**

When blood is collected for blood alcohol estimation, do not use alcohol to cleanse the puncture area and do not use iodine tincture because it contains alcohol. Use povidone iodine instead. Allow the skin to air dry to avoid hemolysis of the blood and to prevent the patient from experiencing a burning sensation when the venipuncture is performed.

## B. Arterial Sampling

This type of blood collection most commonly takes place within a hospital environment. It is used in the identification of metabolic, respiratory, and mixed acid-base disorders, where CO<sub>2</sub> levels require understanding or monitoring. While generally safe, the procedure can be upsetting and painful for the patient. There are also several potential contradictions that can affect the site of the collection, such as a local infection. There is also an increased risk of bleeding complications in patients with coagulopathy.

## C. Fingertick Sampling

Fingertick or fingerprick sampling involves taking a very small amount of blood from the patient, usually from the end of a finger. It is over quickly and requires very little in the way of preparation, therefore, reducing concern and anxiety in patients, particularly in children and nervous adults.

