**\_ Lecture one: Blood collection, blood sampling , phlebotomy**

 **Blood sampling or blood collection method**

Blood collection is Procedure for Blood Testing

**Types of blood vessels to collect blood from:**

**1 - Capillaries**.

**2 – veins :** most commonly used , gives **whole blood** or **serum**

**-serum :** not used in physiology lab , but in the biochemistry labs

**-whole blood :** the one we use . It contains anti-coagulant, which has many types, but the anti-coagulant we use is **EDTA**

**3 – Arteries :**

**1-Capillary or peripheral blood:**

This method used to draw a small amount of blood in special micro tubes usually from the end of a finger (capillary tubes), only a few test can be performed.

**Material:** 1. Lancet 2. Capillary tubes 3. Alcohol **(ethanol 70%)** 4. Cotton

**Procedure:**

1. Sterilize the area by alcohol and allow to dry.

2. Deep quick stab the area by disposable blood lancet, the puncture should be about 3 mm

3. Wipe off the first drop of Blood and a little pressure is applied

4. Never press out Blood

5. Take the Blood

6. Apply slight pressure over the area **(Do not use excessive pressure because the blood may become diluted with tissue fluid).**

**Sites for capillary puncture: -**

1.Finger pulp 2. Heel pulp or great toe (in infant) 3. Ear lobe

**2-Venipuncture blood sampling:**

**A venous sample of blood must be obtained when you need a large volume of blood for laboratory analysis.**

**We must** prepare equipment for blood sampling (Tourniquet, Alcohol, Cotton, Adhesive strip, Sterile Disposable syringes, suitable tubes for each test )

**Best site for blood collection :**

in the cubital fossa from the **Median** , **Cephalic** and **Basilic** veins , **the Median** is usually the best but not always.

**Preparing for blood collection:**

**1- syringe :**

**2- tourniquet** : it is not used if the vein is already visible and we prefer not to use at all because it effects in the result especially calcium , **if it is used we open it as soon as the blood start to enter the syringe . if we remove the syringe before removing the tourniquet**? the vein starts bleeding and it may cause hematoma

**-strong tying of the tourniquet**? increases the pain & causes the vein to disappear

**3- antiseptic:** we use alcohol and usually as alcohol swab, - increasing the amount of alcohol used causes pain and may cause hemolysis to the sample

4-**blood tube**

**Positioning the patient and choosing the vein:**

**1-** The patient should sit comfortable in a chair or sit up in bed.

**2-** patient should be sit for 15 to 20 minutes before the blood is drawn. to avoid hemconcentration and hemodilution

**3-** Avoid arm with burn area, hematoma, scaring, recently injected or withdrawn syringe (tissue fluid accumulation alters test results).

**4-** Apply tourniquet to distend the vein (tourniquet obstructs the venous return so it helps to distend the vein).

**Note**/ as a rule, the tourniquet should not be placed too tightly or left on the patient for more than 2 min.

**What are the effects if the tourniquet left for more than 2 min?**

Prolonged application of the tourniquet results in partial stasis of blood which leads to **hemoconcentration** that increase concentration of serum enzymes, potassium, proteins, and protein bound substances as calcium.

**Vein-puncture:**

1- Check the syringe

2- The plunger must be pushed firmly to the bottom of the cylinder to prevent injection of air into the vein, this can be fatal.

3- Use 70% alcohol as disinfectant the site in concentric circle and let it to dry for 30–60 sec to avoid hemolysis and burning sensation.

 4- Enter by the needle at 45-degree angle (under the skin and then into the vein), When the needle enters the vein there is sudden loss of resistance and blood come in the head of needle.

5- Remove the tourniquet once the needle has been inserted.

**Note** If the needle were removed prior to the Tourniquet being removed, blood would be forced out of the venipuncture site, resulting in hematoma.

6- Withdraw blood gradually by gently pulling upon the syringe plunger.

7- Place a sterile cotton piece over the point where the needle entered the skin.

8- Remove the syringe quickly

9- Dispose of contaminated materials and needles in special disposal containers.

**Common mistakes during blood collection:**

**1-partial penetration of the vein :** causes the blood to leak into the interstitial fluid making the skin color blue,  **the solution :** continue collecting blood , and put a(**compress =** on the skin after collecting blue .



**2-too far insertion of the needle :** causes pain due to reaching the muscles and there is no blood entering the syringe , **the solution :** pull the needle slowly to make it enter the vein and continue collecting as soon the blood appear in the syringe



**3- vein collapse:** the blood filling stops in this case due to weak blood flow and fast filling of the syringe

**-the solution :** stop collecting for a while and resume after the collapse disappear

**4-hitting the wall of the vein:** due to insertion of the needle in a direction that is different then the direction of the vein , **the solution :** try again but feel the direction of the vein before inserting the needle.



**3-Heelstick Procedure (infants):**

**The recommended location for blood collection on a newborn baby or infant is the heel**.

1- Prewarming the infant's heel (42° C for 3 to 5 minutes) is important to increase the flow of blood for collection.

2-Hold the baby's foot firmly to avoid sudden movement.

3- Do not use excessive pressure because the blood may become diluted with tissue fluid.

4. **Arterial Blood Collection:**

**Collection of blood from arteries its usefulness in determination of blood gases measurements :**

 **Arterial blood gas (ABG) test** is a blood test that requires a sample from an artery in your body to measure the levels of oxygen and carbon dioxide in your blood.