**HEMATOCRIT(PCV)**

Hematocrit :- is defind as percentage of erythrocytes to the whole volume of blood,and usually expressed as a percentage of the volume of the whole blood sample (expressed as % (volume/volume)).

-the hematocrite may also be referred to as packed cell volume(PVC).

- PVC: usually determived by spinning ablood –filled capillary tube in a hematocrite centrifuge.

- PVC: common laboratory test can tell aphysician a great deal about the VOLUME of RBC'S sample .

- the volume of RBC'S refers to the amount of space that the RBC'S occupy within the blood.

-if whole blood in placed in a special hematocrit tube (a small test tube )and then spun( نسج)very rapidly in a centrifuge ,the heavier components will quickly settle to(يستقر) the bottom of the tube.

-when the centrifuge spins ,the RBC'S are forced to the bottom of the tube BECAUSE they are the heaviest element in the blood .

-The WBC'S and platelets are lighter so, they come to rest on the top of the heavier RBC'S in a layer called the **buffy coat**.A bove the buffy coat rests the **plasma**.

**Fig 1 ..bage 22**

**SPECIMEN**:

Venous blood anticoagulanted with EDTA or capillary collected directly into heparinized capillary tubes can be used .specimen should be centrifuged within 6 hours of collection .Hemolyzed sample cannot be used for testing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**MATERIALS**:

1. capillary tubes heparinized for fingersticks (red tube) or plane for anticoagulanted blood (blue tube)..75 mm long.

2.clay –type tube sealant

3. microhematocrite centrifuge

**4. microhematocrite reader**

5. Gauze

6. alcohol swab

7. lancets for capillary puncture

**CLINICAL SIGNIFICANCE OF THE TEST :**

1 The PCV is an easily measure for detecting anemia or polycethemia

2. The PCV can be useful in estimating changes in hemodilution or hemoconcentration

3. the PCV is used together with the RBC'S count ,in calculating the mean cell volume (MCV),AND together with HB count in calculating the mean corpuscular hemoglobin concentration (MCHC).

**PCV IS INCREASED IN:**

**Polycethemia** :increased RBC'S count .

**A. phathological: bone marrow malignancy**

**B.physiological:1- Age : (PCV is higher in infants)**

 **2- Altitudes : (PCV is higher )**

**PCV IS DECREASED IN :**

**anemia**..**RBC'S number is decreased**

**RESULTES:**

 Normal values:

-Newborn 53-65% -Adult male 42-52%

 -adult female 37-47%

**MECHANICAL SOURCESOF ERROR :**

1. incomblete sealing of the capillary tubes will give falsely low results BECAUSE in the process of the spinning ,RBC'S and small amount of blasma will be forced from the tube .

2. the microhematocrit centrifuge should never be forced to stop by applying pressure to the metal coverplate .this will cause the RBC'S layer to "sling" forward and results in falselyelevated value .

3. if the centrifugation time is too short or the speed is too low , an increase in trapped plasma **(1-3%)** will occure in normal blood .increased amount of trapped of plasma can produce errors in cases where an erythrocyte abnormality exist , such as **sickle cell anemia** .

4. if too much time elapses between when the centrifuge stops and the capillary tube is removed ,the red cells can begin to settle out and cause a false reading of the hematocrit.

**BIOLOGICAL SOURCES OF ERROR:**

1. If the buffy coat is included in the RBC'S when reading the result , the hematocrit will be falsely elevated .
2. Hemolysis of the specimen can cause a falsely result .
3. -When the microhematocrit is spun for the correct time period and at proper speed ,a small a mount of plasma still remains in the red blood cell portion.This is termed **trapped plasma .**

**-**when comparing spun microhematocrit result with hematocrit result obtained from an electronic cell counter , the spun hematocrit result are generally **(1.3 to 3%)** higher due to this trapped plasma **.**

**-**AN increased amount of trapped plasma is **found in macrocytic anemias , spherocytosis , thalassemia , hypochromic anemias ,and sickle cell anemia.**

**NOTES:**

- MCV=(PCV/# ofRBC'S)

- Normal values of MCV =(80-100)femtoliter(fl) ..,the cells called **normocyte**

- If MCV less than 80 fl ..,the cells called **microcyte**

- If MCV more than 100 fl ..the cells called **macrocyte**

**Please see procedure page 23-24**

**GOOD** **LUCK** ..

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