Lecture Four : Hb estimation by different methods

Manual Haemoglobin (Hb) Estimation : *The Cyanmethaemoglobin Method*

Introduction:

Measurement of Hb concentration in whole blood is a basic screen for anaemia or for polycythemia. There are many methods for the Hb estimation, but the best recommended method is the Cyanmethaemoglobin method.

The advantage or why The cyanmethaemoglobin is a reference method for Hb estimation?

1. standardized and possessing stable solutions.
2. All types and compounds of Hb except sulphaemoglobin are estimated.
3. Highly reliable, and stable standard are available

sample used :Venous or capillary blood collected in EDTA.

Normal Range of Hb according to age :

- Adult males: 14-18 g/dl
- Adult females: 12- 16 g/dl
- Children: 11-14 g/dl.
- Newborn infants: 13.0-20 g/dl

Lecture five : Haematocrit (Packed Cell Volume – PCV) Determination

The haematocrit (PCV) is the percent of the packed red cells in a volume of whole blood.. It reflects the combination of total number of RBCS , and the volume that they occupy in plasma .

Principle:

A volume of anticoagulated blood by EDTA or capillary tube which is centrifuged then blood will be separated into three layers: Red cells, Buffy coat (WBC and platelets) and plasma. Ideally there should be complete separation of the three layers.

Haematocrit is the ratio of the height of red cells column to that of the whole blood in the tube.

The two methods of direct measurement of the PCV which are in current use are:

1. Macro-method using Wintrobe tubes.

2. Micro-method using capillary tubes.

3. Electronic cell counting

The more popular one is the micro-method ?, as it has the advantage? why pcv is so important?

- short time of centrifugation
- better packing of the red cells.
- Simple , Accurate , Reliable
- Screening for large clinic population
- Screening test for anemia and polycythemia

Test sample:

Heparin or EDTA venous or capillary blood.

Equipments:

- Micro-haematocrite centrifuge.

- Plastic sealer or Bunsen burner.

Disposable materials:

- Capillary tubes 75 mm long and internal diameter of 1 mm.

the haematocrit result is expressed in percentage.

ormal ranges: The normal values of PCV vary according to the age and sex of the individuals. The normal ranges are

- Adult males = 40% - 52%.
- Adult females = 37% - 47%.
- Pregnant =30%–46%
- Neonates = 40%–68%

PCV-Low

1. **in pregnancy** Cause is a hemodilution the RBCs are "diluted

2. Low RBC production from the bone marrow **(**Toxins, cancer, lowEPO)

3. IDA, aplastic anemia. Hemolytic anemia etc

PCV-High : A high hematocrit value may **truly** reflect an increase in the fraction of RBCs

1. polycythemia vera
2. secondary polycythemia (smoking, kidney cancer, high attitude living

3-reactive polycythemia (vomiting and diarrhea, **Burn)**