## Packed Cell Volume (Hematocrit)

The packed cell volume (P.C.V.) measurement is a good routine test for anemia

P. C.V.: is the proportion of the volume of RBCs relative to the total volume of the blood.

The P.C.V. is also used in conjugation with the Hb concentration to calculate the mean corpuscular Hb concentration. When a tube of blood is centrifuged, the erythrocytes pack into the bottom part of the tube with the plasma on top. The white cells and platelets are found in a thin area "the buffy layer" above the column of red cell (fig .I)
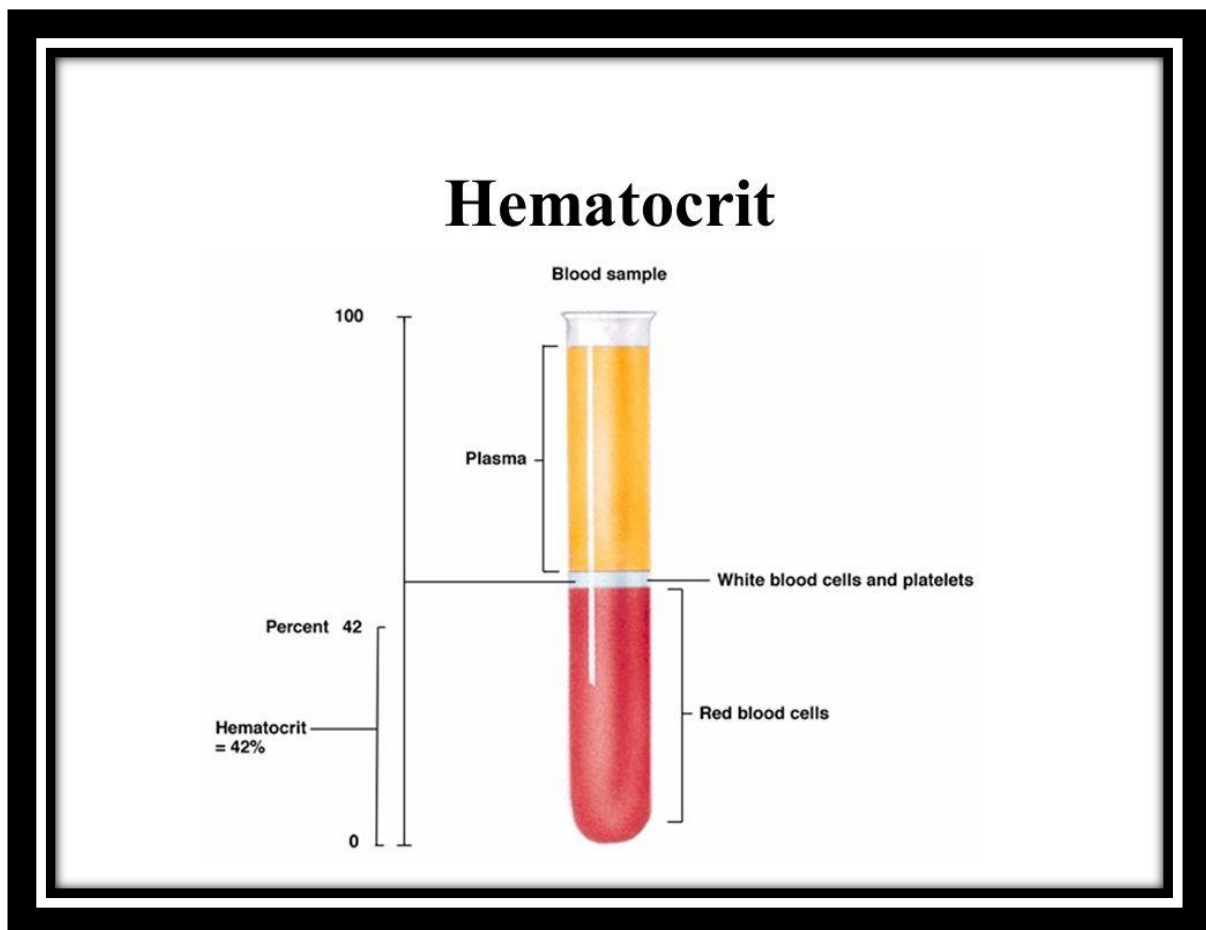

(Fig. 1)

Materials required:

1. Blood sample.

2. Capillary tube with 75 mm length and 0.6 0 and 0.6-0.8 mm diameter which should be:

a. Heparinized if the blood is collected directly.

b. Non heparinized, if the blood contain anticoagulant material.

3. Special plasticized sealing material.

4. Microhaematocrit reader. T

5. Microhacmatocrit centrifuge.

Procedure:

I- Produce a free flow of blood from the tip of the Finger.

2- Place the marked end (red) of the capillary tube into the drop of the blood. Draw the blood two thirds of the way into the tube. The tube fills rapidly if you hold the open end downward from the source of the blood.

3- Seal the end of the capillary tube (the blood end) with sealing material.

4- Place the capillary into the micro-hematocrit centrifuge, an screw on the safety cover, close the lid and spin at 11000 rpm for min. (2 min. is normally sufficient, but 5 min. will also ensure that polycythemia blood is fully packed).

Note: making sure that the sealed end is against the ring of rubber at the circumference. Properly balance the tubes in the centrifuge

5- Place the spun tube into the micro-hematocrit reader (fig.2) the length of the packed cells directly as a percentage capillary tube on the moving scale of the reader, the closed end (zero) and the plasma end on (100) point, move the scale until the white line separate the plasma from the packed red cells layer.
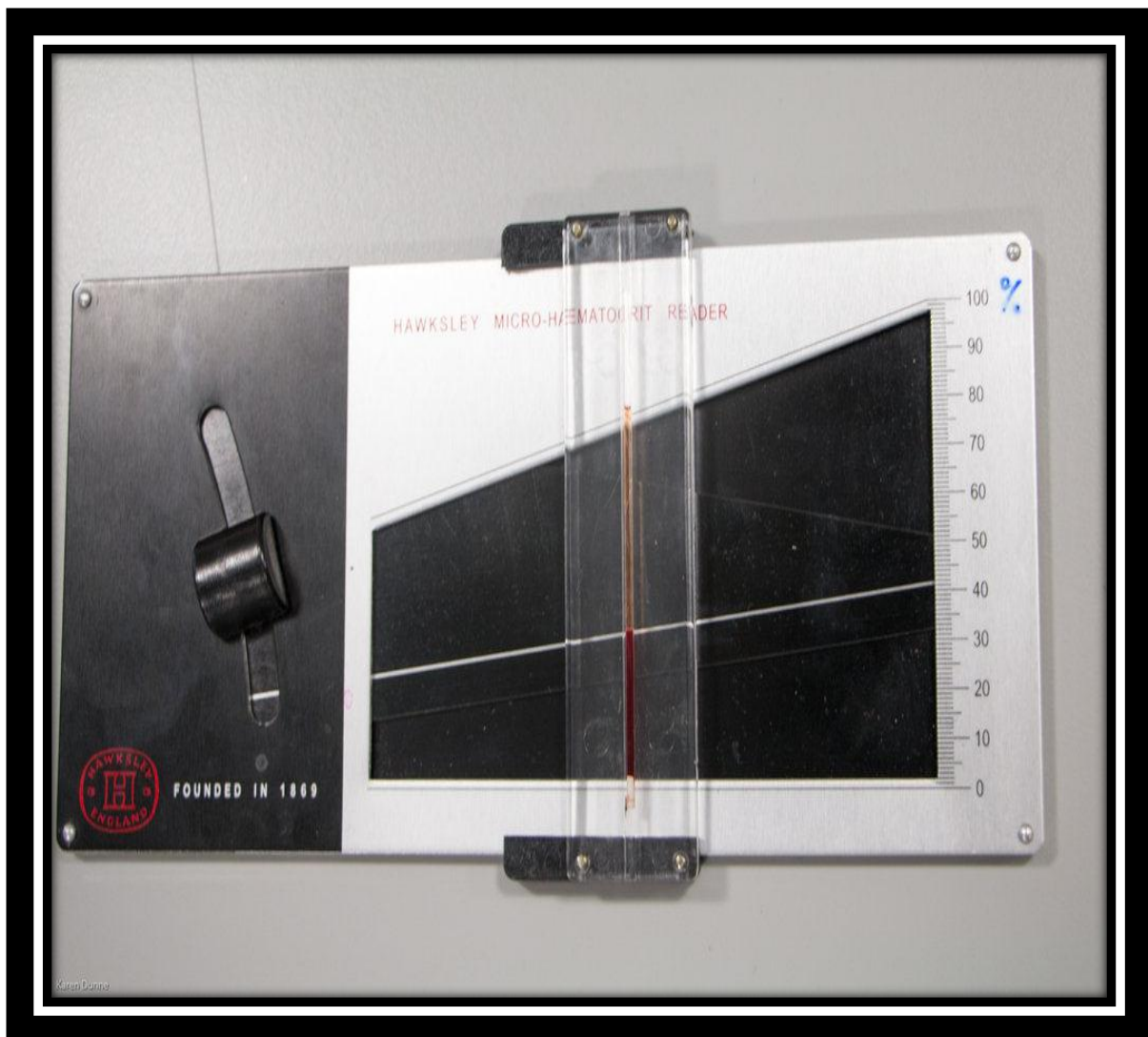
(Fig. 2)

Source of Errors:

1. Irregular bore.

2. Bad sealing

3. Vibrating irregular spinning

4. Old sample.

5. Excess anticoagulant.

6. Variation in the bore of the tube.

7. Hemolysis of specimen.

8. Inadequate mixing.

9. Prolonged tourniquet stasis

10. Inclusion of the buffy coat in reading the packed column.

Factors Effect P.C.V.:

1-Hemorrhage

Immediately following an acute hemorrhage, the P'.C.V. and R. B.C.s count may be normal, but during the recovery phase, the blood volume will increase due to increase the plasma volume, so both P.C.V. and R.B.C.s count will be reduced.

2. Dehydration

Dehydration will produce increase in P.C.V. and R.B.C.s count.

P.C.V. increase in polycythemia, either physiological or pathological. P.C.V. decrease in :

a. Acute anemia.

b. Some liver and spleen disease.

c. Kidney disease.

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