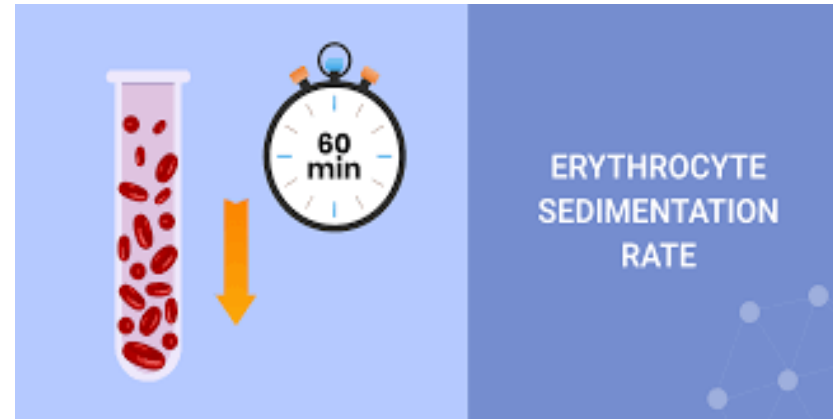


Basra University – Pharmacy College

Practical Physiology

Erythrocytes Sedimentation Rate (ESR)

2nd Sem , 03-04 March 2024



Lecturer

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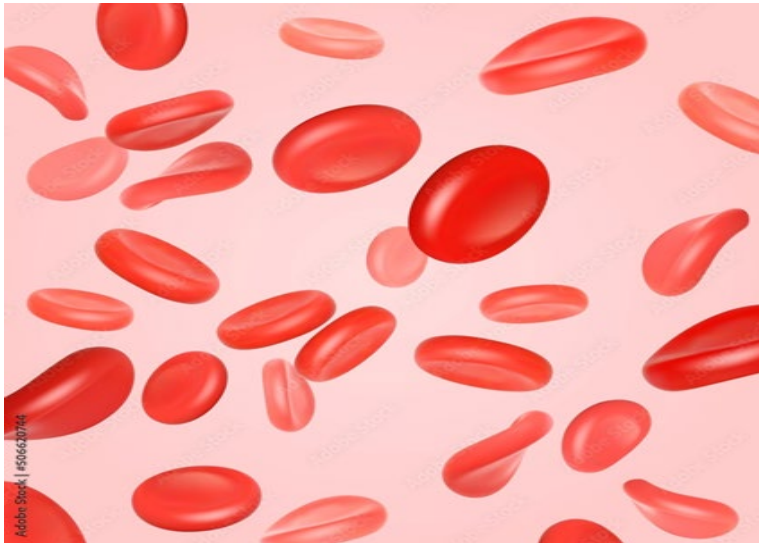
Erythrocyte sedimentation rate (ESR)

- It is the rate at which the red blood cell sediment (settle down) when the blood containing an anticoagulant is allowed to stand in a vertically placed tube agent.
- It is expressed in millimeter at the end of first hour.
- This test is a sensitive but non specific index of plasma protein changes which result from inflammation or tissue damage.
- It is often required by a physician to judge the progress of the disease in patients under treatment or to follow the progress of a disease.

Rouleaux formation and ESR

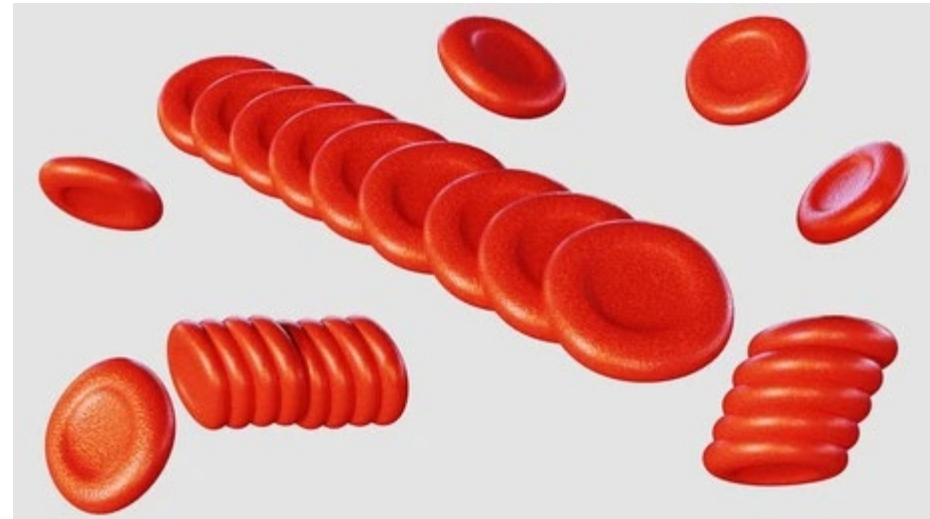
Normal condition

In the circulating blood : the red cells remain uniformly suspended in the plasma.



Rouleaux formation

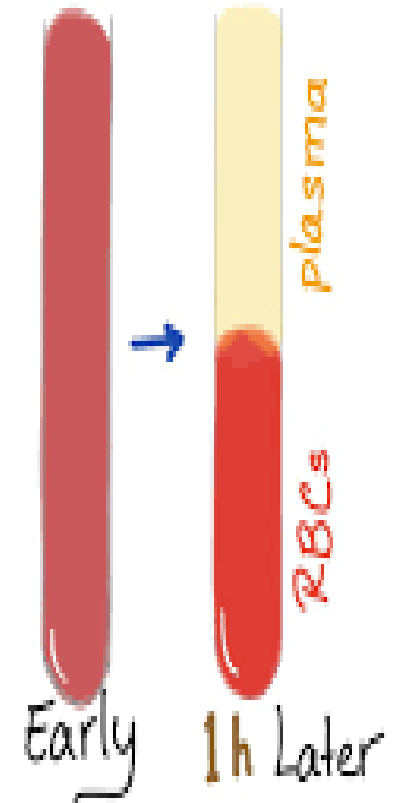
It refers to the tendency of RBCs to pile one over the other like a pile of coins.



Principle of ESR

- the principle for ESR testing is based on the differences in densities of plasma proteins and RBCs.
- Since RBCs are denser than plasma proteins, they tend to settle at the bottom.
- While the plasma collects above the RBC aggregate as supernatant.

ESR



APPARATUS AND MATERIALS

A / WINTROBE'S method

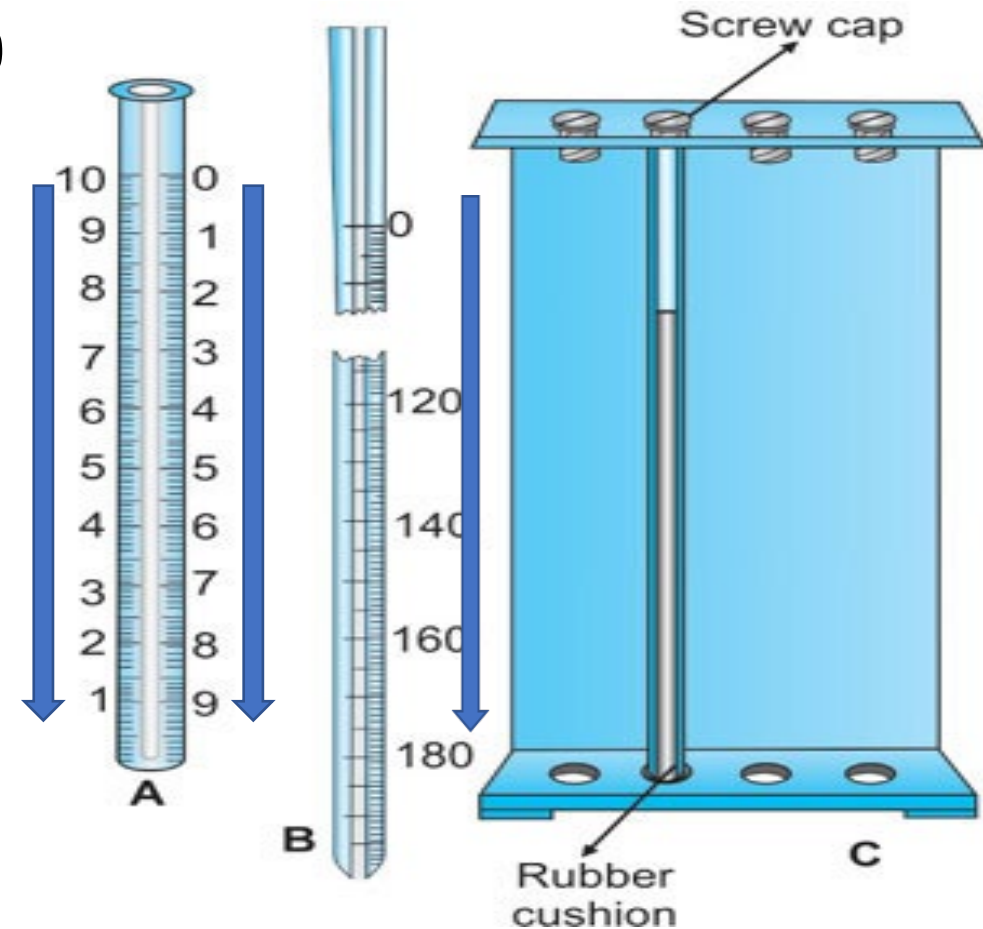
- It is graduated 0 to 10 cm from above downwards on one side (for ESR) and 10 to 0 cm on the other side (for Hct/PCV).

B/ Westergren method

- it is open at downward end.
- Marking is differ , for ESR only.

C/ Stand : hold tubes vertically throughout

the test



ESR fast detector method

- It is done on a blood sample using a syringe attached to a fine needle to collect a venous blood from the patient.
- transfer it to a container of anticoagulant (Sodium citrate).
- Transfer the tube to its stand in vertical form .
- Leave the tube undisturbed in this position for 30 mins-60 mins
- At the end of which read the mm of clear plasma above the red cells.



Clinical significance of ESR

Normal values of ESR

- Males : 3-7 mm / 30 mins-60 mins
- Females : 5-9 mm / 30 mins-60 mins
- ESR values are raised in a large number of pathological conditions.
- The ESR is affected by several factors : age, sex, menstrual cycle, pregnancy, and drugs (e.g oral contraceptive pills OCP, steroids).

References

- A TEXTBOOK OF PRACTICAL PHYSIOLOGY
- A TEXTBOOK OF ANATOMY & PHYSIOLOGY FOR NURSES AND ALLIED HEALTH SCIENCES
- OXFORD HAND BOOK OF CLINICAL HAEMATOLOGY