ESR (Erythrocyte Sedimentation Rate) measures how fast red blood cells settle in a tube in one hour. It is a nonspecific test for inflammation.

Normal Range:

- Men: 0–15 mm/hour
- Women: 0–20 mm/hour
- Children: 0–10 mm/hour

Increased ESR:

1. Infections (e.g., tuberculosis)
2. Inflammatory diseases (e.g., rheumatoid arthritis, lupus).
3. Cancers (e.g., multiple myeloma).
4. Pregnancy or anemia.

Decreased ESR:

- Polycythemia or sickle cell anemia.

Clinical Use:

1. Detects inflammation.
2. Monitors disease activity (e.g., arthritis).

While useful, ESR is nonspecific and often combined with other tests like CRP for better accuracy

. Several factors can affect the Erythrocyte Sedimentation Rate (ESR), influencing its accuracy and interpretation:

1. Physiological Factors:

- Age: ESR increases with age.
- Gender: Higher in females than males.
- Pregnancy: Elevated ESR due to increased fibrinogen levels.

2. Hematological Factors:

- RBC Size and Shape:
- Macrocytes settle faster (increased ESR).
- Abnormal shapes (e.g., in sickle cell anemia or spherocytosis) reduce ESR.

• RBC Count:

• Anemia: Fewer RBCs = higher ESR.

• Polycythemia: More RBCs = lower ESR.

3. Plasma Composition:

• Increased ESR:

• High fibrinogen levels (e.g., inflammation, pregnancy).

• High globulins (e.g., multiple myeloma, infections).

• Decreased ESR:

• Hypofibrinogenemia.

• Increased albumin (opposes rouleaux formation.(

4 .Pathological Conditions:

a) Infections: Elevate ESR due to inflammation.
b) Inflammatory Diseases: Rheumatoid arthritis, lupus.
c) Cancers: Especially multiple myeloma and lymphomas.
d) Severe Liver Disease: Can either increase or decrease ESR based on protein synthesis.

5. Medications:

• Increase ESR: Oral contraceptives, steroids.

• Decrease ESR: NSAIDs, corticosteroids, aspirin.

6. Technical Factors:

• Sample Handling: Delay in testing or tilted tubes may increase ESR.

• Temperature: High ambient temperature can raise ESR.

In summary, ESR is influenced by age, gender, RBC characteristics, plasma proteins, diseases, and technical factors, which should be considered when interpreting results.

HOW to do ESR?

The Erythrocyte Sedimentation Rate (ESR) test measures how quickly red blood cells (RBCs) settle in a vertical tube of blood. There are two main methods for performing the test:

1. Westergren Method (Standard Method):
2. Wintrobe Method:

1.Westergren Method (Standard Method):This is the most commonly used and standardized method for ESR testing.

Procedure:

1 .Sample Collection:

• Collect venous blood into a tube containing an anticoagulant (commonly EDTA or sodium citrate.(

2 .Dilution:

• Mix 4 parts blood with 1 part sodium citrate (if not pre-anticoagulated.(

3 .Tube Setup :

Place the blood in a Westergren tube (a 30 cm long, 2.5 mm diameter glass tube marked in millimeters).

• Keep the tube vertical in an ESR stand.

4 .Incubation:

• Leave the tube undisturbed for 1 hour at room temperature.

5 .Reading the Result:

• Measure the distance (in mm) from the top of the blood column to the top of the settled RBC layer.

2 .Wintrobe Method:

This is an older method, less commonly used, and involves a shorter tube.

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