



## Department of Anesthesia Techniques



# Erythrocyte Sedimentation Rate

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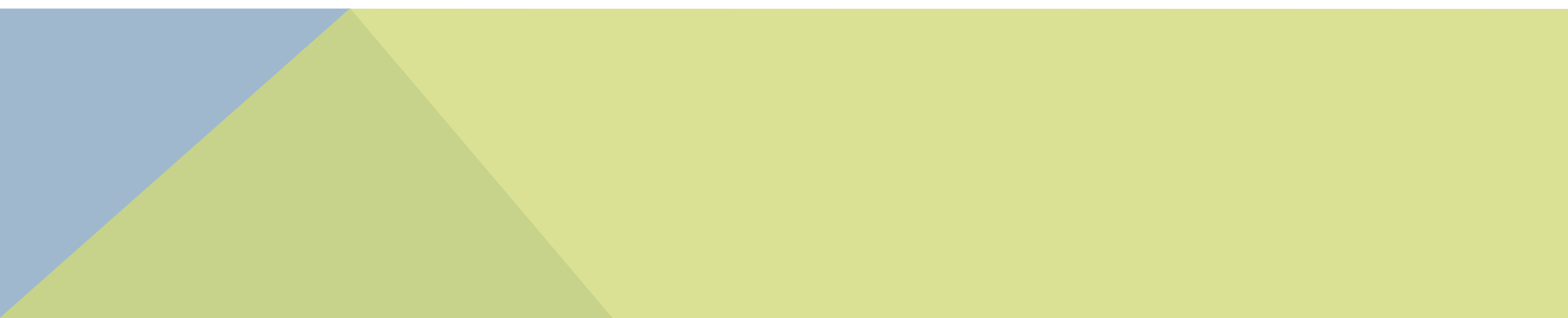
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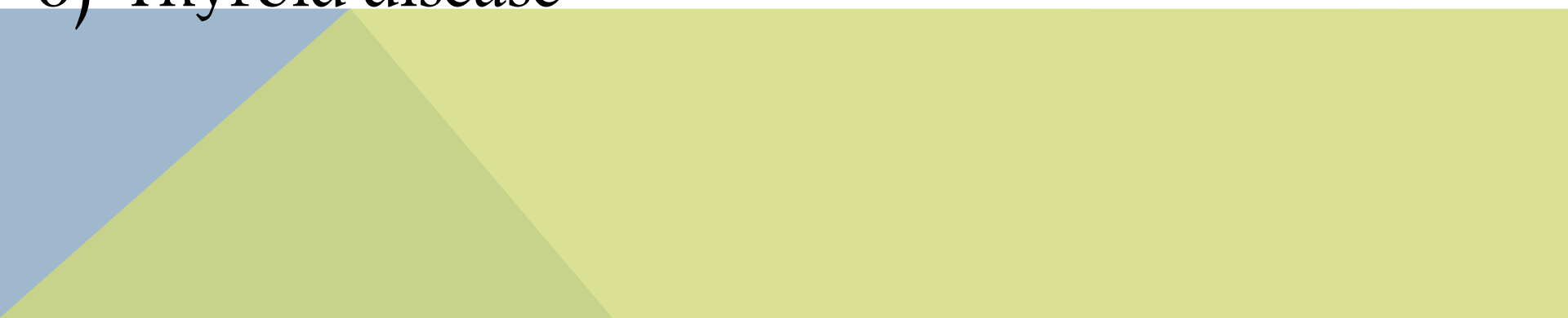
## ❖ Erythrocyte Sedimentation Rate (ESR)

- ❖ Is the rate at which red blood cells descend in a standardized tube over a period of one hour.
- ❖ It is a nonspecific blood test that used to detect and monitor an inflammatory response to tissue injury.

- The clustering together of red blood cells as a result of excess or abnormal blood proteins (especially fibrinogen) that shorten the normal distance that red blood cells keep between each other.
  - The ESR begins to rise at 24 to 48 hours after the onset of acute self-limited inflammation, decreases slowly as inflammation resolves.
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# Causes of Increase ESR

➤ An increased ESR rate may occur in people with:

- 1) Infection
  - 2) Anemia
  - 3) Cancers such as lymphoma
  - 4) Kidney disease
  - 5) Pregnancy
  - 6) Thyroid disease
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# Causes of Decrease ESR

Lower-than-normal levels occur with:

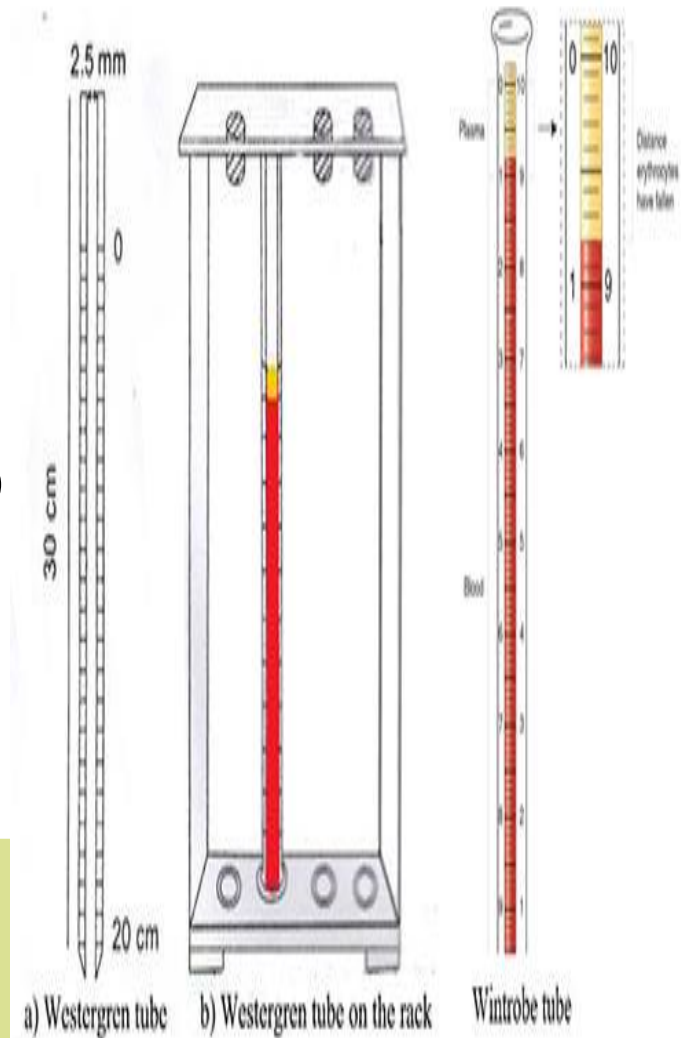
1. Congestive heart failure
2. Hypofibrinogenemia (decreased fibrinogen levels)
3. Leukemia
4. Low plasma protein (due to liver or kidney disease)
5. Polycythemia
6. Sickle cell anemia

# Principle of ESR Measurement

- Anticoagulant is added to the blood and allowed to stand in specific tube in vertical form.
- RBC slowly sediment to the bottom of the tube leaving clear plasma as the supernatant.
- The rate of sedimentation under standard conditions and specific period is know as ESR.

## APPARATUS and REAGENTS:

1. Blood sample.
2. Tri-sodium citrate
3. Westergren tube (length 300 mm), Diameter 2.5 mm, Graduated from zero (top) to 200 (bottom).
4. ESR rack
5. Pipette
6. Cotton



# Procedure

1. Collecting 2 ml of venous blood into a tube containing 0.5 ml of sodium citrate and Mix gently without shaking.
2. Then put the blood in the graded tube(Westergren tube ) to the 200 mm mark.
3. The tube is placed in a rack in a strictly vertical position for 1 hour at room temperature.
4. The distance of fall of erythrocytes, expressed as millimeters in 1 hour, is the ESR.



# The Normal Value

In men            0–15 mm/h.

Women            0–20 mm/h

Children           0–10 mm/h