Department of Anesthesia Techniques

Title of the lecture

ERYTHROCYTE SEDIMENTATION RATE (ESR)

by

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ESR OVERVIEW

- (ESR) is a nonspecific measurement used to detect and monitor an inflammatory response to tissue injury (an acute phase) in which there is a change in the plasma concentration of several proteins (termed acute phase proteins).

- ESR : is distance that erythrocytes fall per unit of time in specific column.

PRINCIPLE OF ESR

- Anticoagulant is added to the blood and allowed to stand in specific tube in vertical form.
- Red corpuscles 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.

METHODS OF ESTIMATION FOR E.S.R

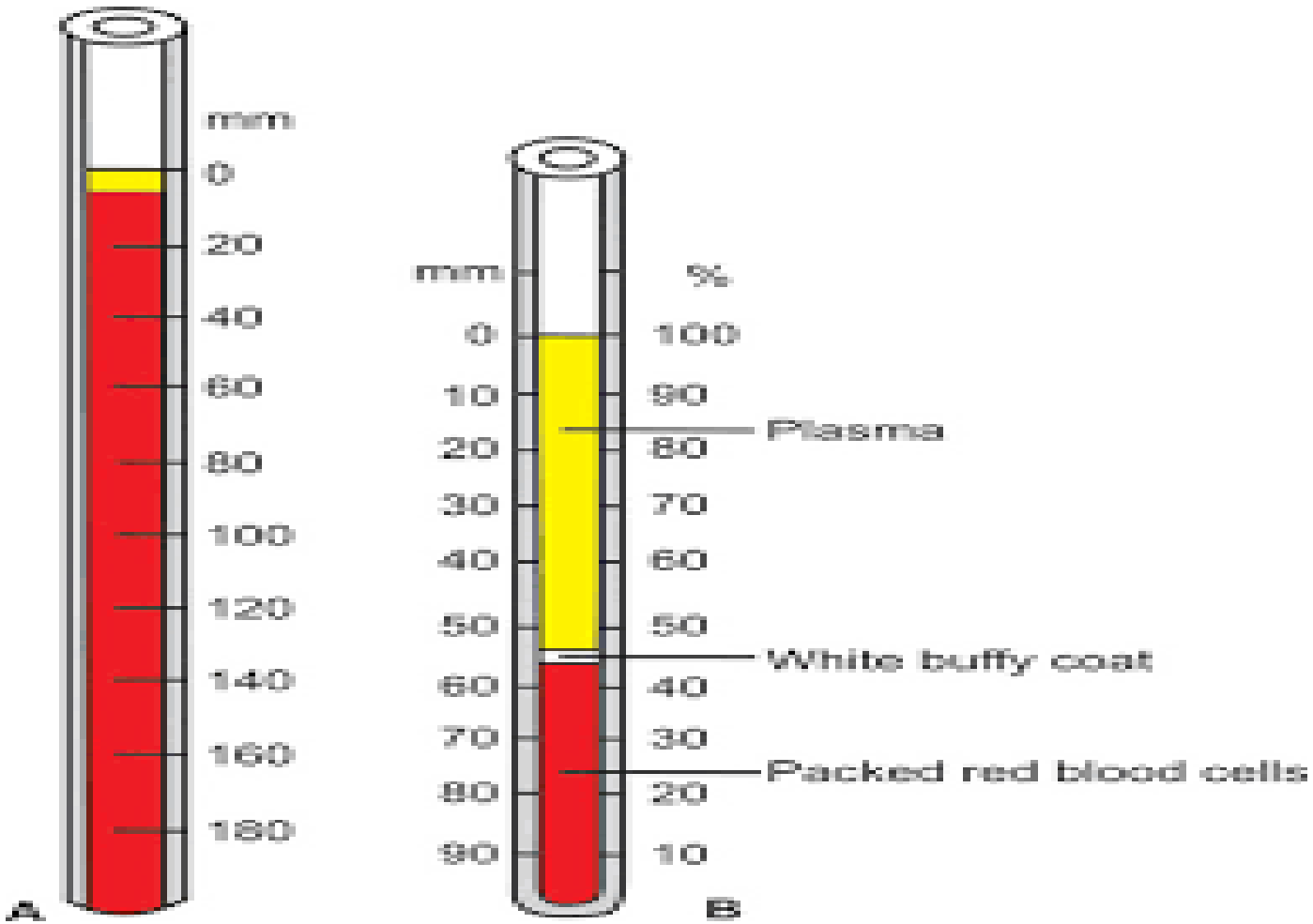
Westergren method

Westergren tube

Length (300 mm)

Diameter (2.5 mm)

Graduated from zero (top) to 200 (bottom).


mm
0
20
40
60
80
100
120
140
160
180
A
mm
%
0
100
10
90
20
80
30
70
40
60
50
50
60
40
70
30
80
20
90
10
Plasma
White buffy coat
Packed red blood cells
B

APPARATUS AND REAGENTS

Blood samples

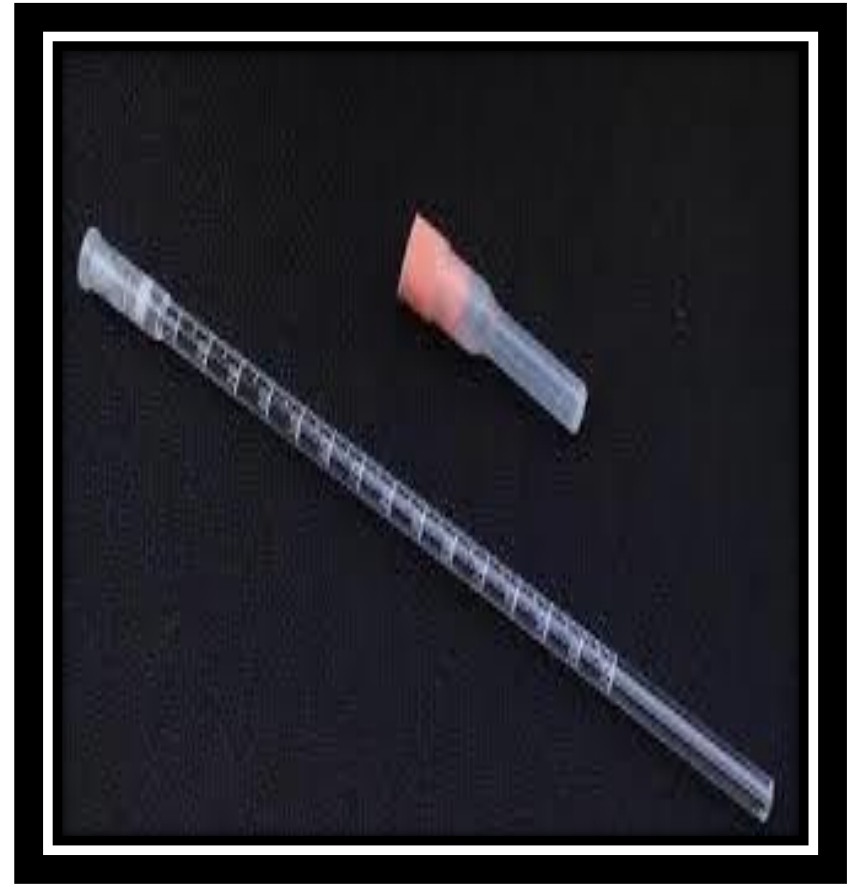
Tri-sodium citrate

Wastergren tube

ESR rack

Pipette

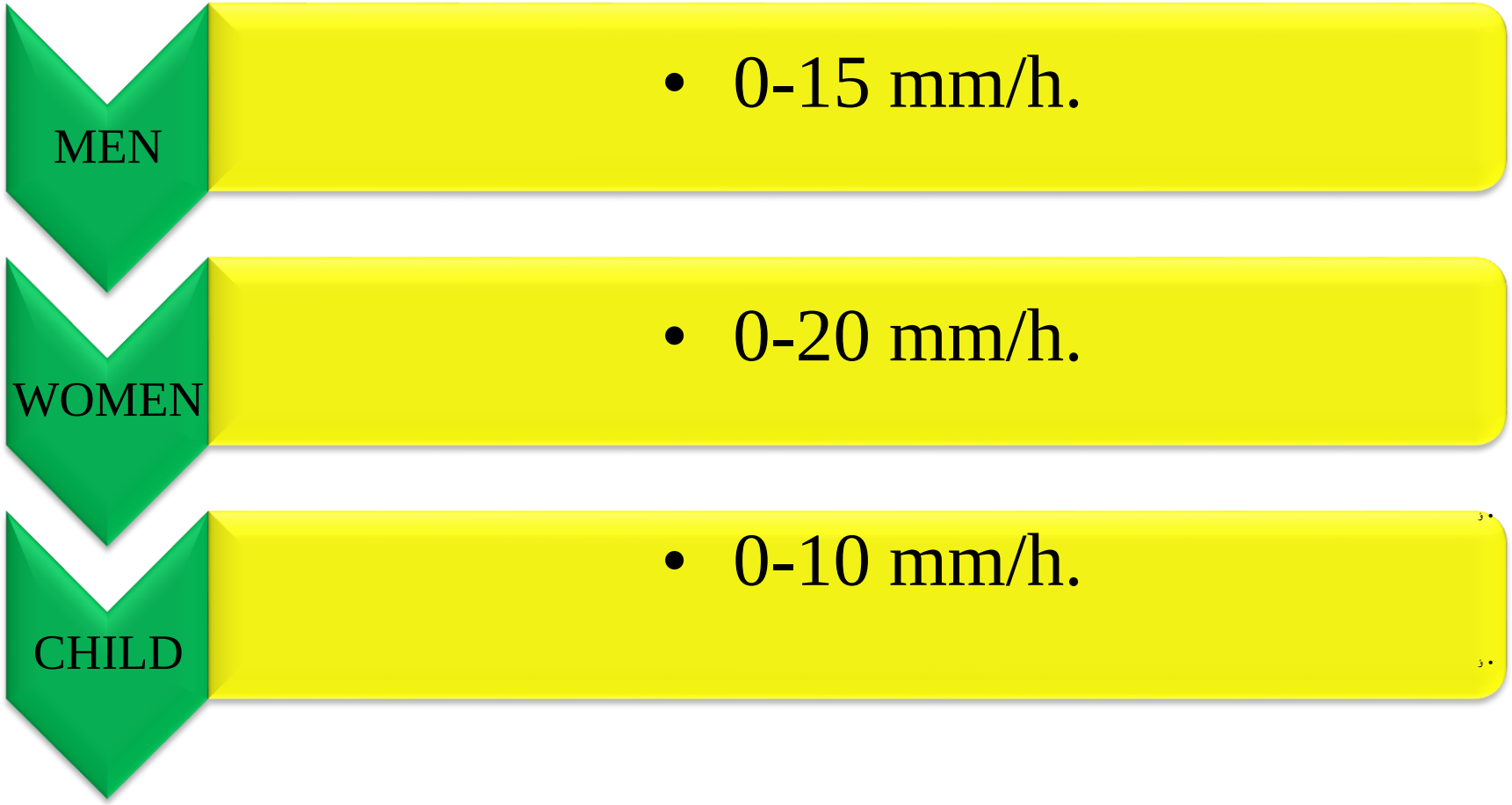
Cotton

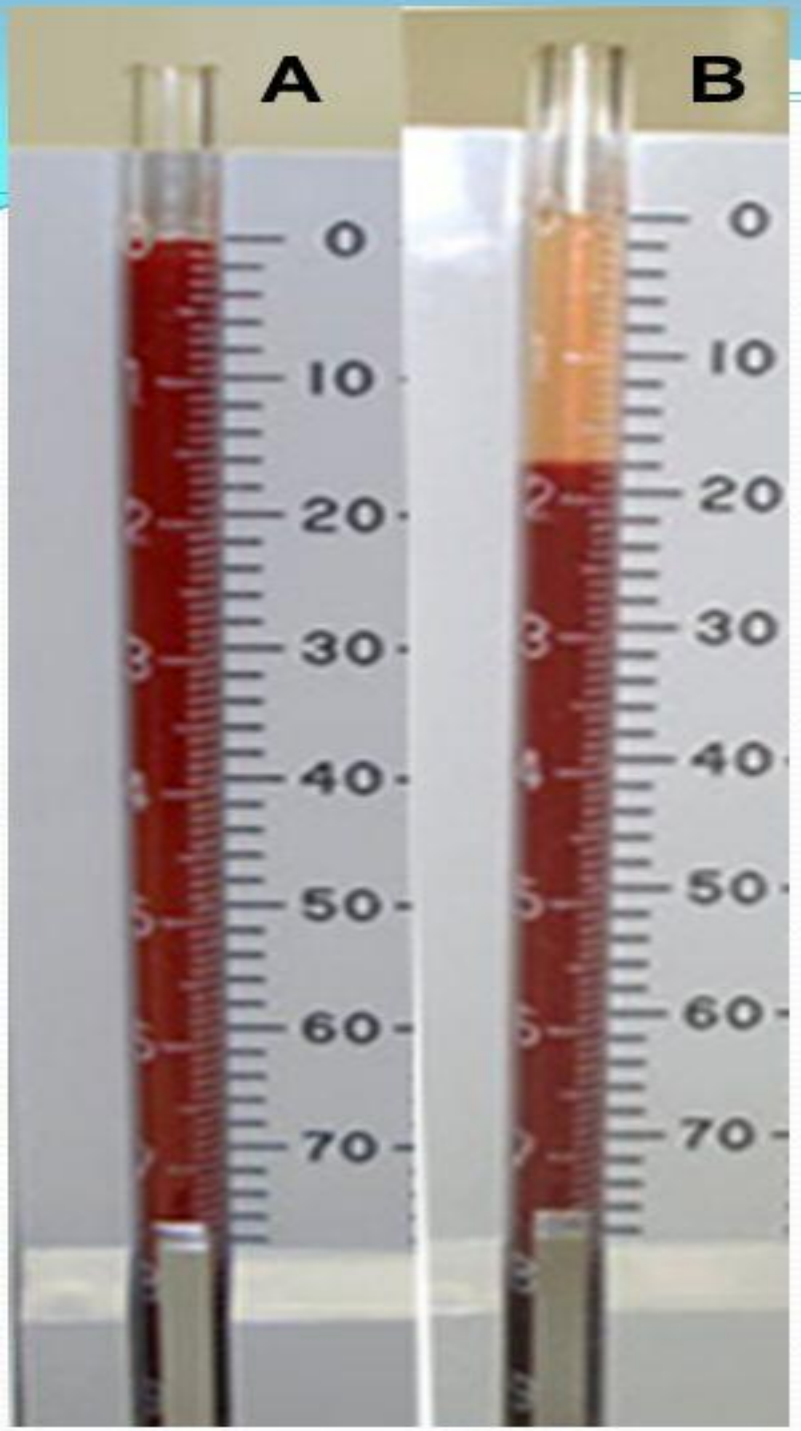


PROCEDURE OF E.S.R

- Patient must fasting at least 4 hours before testing.
- The blood sample must be mixed with anticoagulant agent in this test.
- Put 0.4 ml sodium citrate + 1.6 ml blood . OR put 0.2 ml sodium citrate + 0.8 ml blood . (1:4)
- Mix gently with out shaking then put in the graded tube and leave it stand vertically on the stand for 1 hour.
- Read the amount of plasma that appeared without moving it then leave it to the second hour and read another time.

NORMAL VALUE





A at “0” hr; B after 1 hour

Red blood cells have settled, leaving plasma at the top of the tube. Reading: 18 mm/hour

SOME STATUS WHICH INCREASED ESR

- Macrocytes (large size RBC).
- Rheumatoid arthritis.
- Tuberculosis.
- Anemia.
- Pregnancy.

SOME STATUS WHICH DECREASED ESR

- Microcytes (small size RBC, B12 deficiency).
- Sickle cells anemia.
- Polycythemia.


Thank
YOU