Al Muthanna University College of Pharmacy

Platelet Count or PLT count (Thrombocyte Count)

By
Dr. Sarah Zghair Hussein
Second Stage

Thrombocytes: they are commonly known as platelets. They are small, biconvex non–nucleated cells, usually found in clusters in a dried film.

Normal values: 150.000 - 400.000μL.

Size: diameter 2.5μ (2-4μ).

Life span: 8-12 days

Functions:

1. Arrest of bleeding: Platelets aggregate at site of injured vessel and form a haemostatic plug to prevent blood loss.
2. Coagulation: Platelets release clotting factors, phospholipids and prostaglandins which help in the clotting process.
3. Clot retraction: The release of thrombesthanin from the platelets helps in clot retraction.
4. Repair of endothelium: Platelets release platelet derived growth factor (PDGF) which help in the repair of damage capillary endothelium and other tissues.
5. Release of serotonin and epinephrine: These substances released from platelets produce vasoconstriction and consequently reduce the blood loss.

There are two methods for counting of platelets:

1. Electronic (Caulter counter).
2. Manual (microscopic).

Objectives of platelet count :

1. To know the methods of performing a platelet count.
2. To perform a platelet count.
3. Know the normal values.
4. Know the possible causes of abnormal platelet counts.

Materials and instruments:

1. Diluting fluid (31.3 gm sodium citrate, 10 ml of formaldehyde 40%) added to it distilled water up to 100 ml.
2. Micropipette.
3. Venous blood.
4. Neubauer chamber (Hemocytometer)
5. Petri dish.
6. Filter paper.
7. Microscope.

Procedure:

1- Once you prepare the ammonium oxalate by mixing it from a still stand point because **the reagent has a tendency to settle down to the bottom of the flask**; then you can use it to dilute your blood which will **destroy the red blood cells** so that you can view the platelets as tiny shimmering fragments under a microscope.

2- Next charge your chamber slowly via 45° angle.

3- Place the chamber inside a petridish with wet cotton and cover it up and cover it with the lid and wait for 15-20 minutes.

4- Count the cells in the 5Rs if there is no thrombocytopenia and multiply with 1000.

5- If the cell count is less than 100,000 then you need to count all the 25 boxes in the RBC counting area and multiply what you find by 200.

Calculations:

In case Platelets count the dilution is the same as WBC count but the counting is performed in the RBC area.

Number of platelets (cu.mm) = N x 1000

10: correction for volume

100: correction for dilution

Number of platelets in L = N x 1000 x 106

Conditions affecting number of platelets in blood:

a. Thrombocytopenia (Low platelet count) less 150.000μL
Clinically: less 50.000μL

c. Thrombocytosis (High platelet count) more 400.000μL
Clinically: more 750.000μL

Causes of Thrombocytopenia (low platelet count)

1. Reduced production of platelets
2. Increased breakdown of platelets
3. Trapping of platelets in the spleen

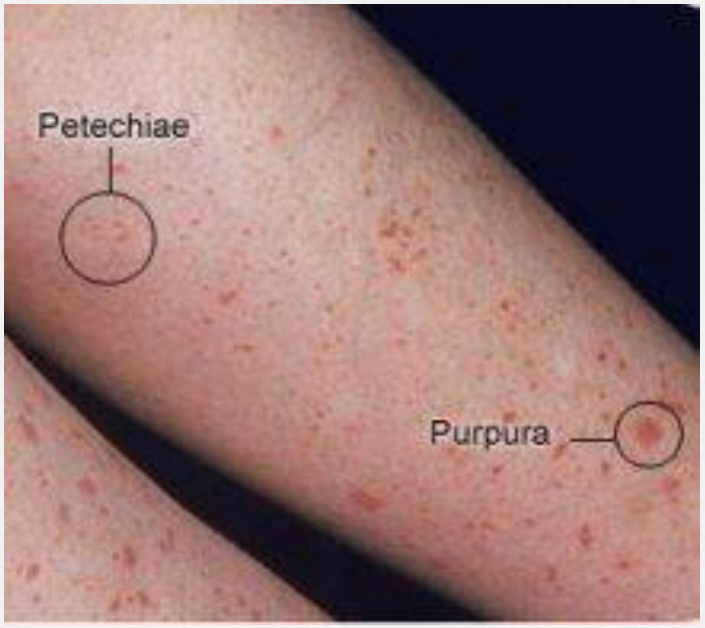
Reduced production of platelets

1. Leukemia
2. Some types of anemia
3. Viral infections
4. Cancers that affect bone marrow
5. Chemotherapy drugs
6. Heavy alcohol consumption

Increased breakdown of platelets

1. Pregnancy
2. Idiopathic thrombocytopenic purpura (ITP)
3. Other autoimmune diseases, such as lupus and rheumatoid arthritis
4. Septicemia severe bacterial infections
5. Thrombotic thrombocytopenic purpura (TTP), a rare, life-threatening condition TTP can happen sporadically or as a side effect of some medications
6. Hemolytic uremic syndrome
7. Dengue fever

Purpura: A reduction in platelet count results in purpura. It is a bleeding disorder in which hemorrhagic tendency increases and there may be subcutaneous hemorrhage.



Signs and symptoms of a low blood platelet count may include:

a. Easy or excessive bruising

b. Superficial bleeding into the skin that appears as a rash of pinpoint-sized reddish-purple spots (petechiae), usually on the lower legs

c. Prolonged bleeding from cuts

d. Spontaneous bleeding from gums or nose

e. Blood in urine or stool

f. Unusually heavy menstrual flows

g. Profuse bleeding during surgery

h. Serious or widespread bleeding indicates an emergency and requires immediate care.

Thrombocytosis (high platelet levels)

1. Reaction to an infection
2. Surgery
3. Certain medications
3. Polycythemia vera, in which the bone marrow produces too many platelets too quickly.

Platelets tests:

Either; **Platelet number** by platelet count

Ex. Thrombocytopenia

Or; **Platelet function** by bleeding time

Ex. thrombasthenia