Lec 10: Platelet Count , Practical Introduction to Platelet Count

Definition:Platelet count is a laboratory test that measures the number of platelets (thrombocytes) in the blood. Platelets are small, disc-shaped cell fragments essential for blood clotting and hemostasis.

Indications for Platelet Count : Platelet count is performed to evaluate:

1. **Bleeding disorders (e.g., thrombocytopenia, thrombocytopathy.(**
2. **Bone marrow disorders (e.g., leukemia, aplastic anemia.(**
3. **Monitoring chemotherapy or radiation therapy.**
4. **Thrombocytosis (excessive platelet production) in conditions like myeloproliferative disorders.**
5. **Preoperative assessment to check bleeding risk.**

Normal Platelet Count:

- **Adult & Children: 150,000 – 450,000/µL**
- **Newborns: 100,000 – 350,000/µL**

Methods for Platelet Count

There are three main methods to determine platelet count:

A. Automated Platelet Count (Hematology Analyzer)

- **Most common method, using an automated cell counter.**
- **Principle: Electrical impedance or laser light scatter differentiates platelets from other blood cells.**
- **Advantage: Quick, accurate, and provides platelet indices (MPV, PDW)**
- **Limitation: Can be affected by platelet clumping (false low count.(**

B. Peripheral Blood Smear (Manual Microscopy)

- **Confirmatory method when an automated count is abnormal.**
- **Procedure:**
- **A thin blood smear is stained with Wright-Giemsa stain.**

• **Platelets are counted manually under oil immersion (100x magnification).**

• **Estimated platelet count :Count platelets in 10 high-power fields (HPFs).**

• **Multiply average count per HPF by 15,000–20,000 to estimate platelets/µL.**

• **Use: Identifies platelet clumping, size variation, and morphology (e.g., giant platelets in ITP, small platelets in Wiskott-Aldrich Syndrome).**

C. Hemocytometer (Manual Counting - Rarely Used)

• **Uses a Neubauer chamber with diluted blood.**

• **Formula: Platelet count=average plat in 5 square *dilution factors divided by volume factors**

•**Rarely used due to inaccuracy compared to automated methods.**

Interpretation of Platelet Count

Condition	Platelet Count
Normal range	150,000 – 450,000/µL
Thrombocytopenia (<150,000/µL)	Bleeding disorders, leukemia, DIC, ITP, aplastic anemia
Thrombocytosis (>450,000/µL)	Myeloproliferative neoplasms (e.g., ET, CML), inflammation, iron deficiency

Sources of Error in Platelet Counting:

1. **Platelet clumping (EDTA-induced pseudothrombocytopenia) → Use citrate tube instead.**
2. **Giant platelets miscounted as RBCs in automated counters.**
3. **Debris miscounted as platelets in low-quality samples.**

Conclusion

• **Platelet count is essential for diagnosing bleeding and clotting disorders.**

• **Automated counters provide quick and reliable results, but manual smear examination is needed in cases of abnormal morphology or clumping.**

• **Always correlate findings with clinical history and other hematological tests.**

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