Table 48.2: Laboratory tests in bleeding disorders		
Screening tests	*Accessory tests*	*Others*
Platelet count Bleeding time Prothrombin time (PT) Activated partial thromboplastin time (APTT) Thrombin time (TT)	Capillary fragility test (tourniquet test) Clotting time Clot retraction test	Prothrombin consumption time Factor assay

TESTS FOR PLATELET COMPONENT

Platelet Count

It is obtained on anticoagulated blood either manually or by electronic particle counters (Chapter 41).

Normal range of platelet count: 1,50,000 to 4,50,000 platelets/cu mm.

Precaution: When the platelet counts are beyond the normal range, they should always be verified by examining the peripheral smear. This is because clumping of platelets can result in spurious low count during automated counting. Increased platelet count is usually seen in myeloproliferative neoplasms (e.g. essential thrombocythemia).

Causes of thrombocytopenia and thrombocytosis are discussed in Chapters 35 and 41.

Platelet Aggregation

Principle: These tests measure the ability of platelets to aggregate in response to agonists like thrombin and form the basis for qualitative tests of von Willebrand factor.

Use: For classification of congenital qualitative disorders of platelets.

Clot Retraction Test

Principle: After the coagulation of blood, the clot under the action of thrombasthenin (a substance released from platelets) undergoes contraction and starts retracting within one hour. The clot shows 50% retraction in 2 to 4 hours. This process is completed in 18 to 24 hours with separation of serum. Subsequently, the fibrin clot dissolves due to fibrinolysis and the RBCs sink to the bottom. Clot retraction is dependent on normal platelet number, platelet function, concentration of fibrinogen and the activity of the fibrinolytic pathway.

Procedure

- Place a tube containing blood in a water-bath at 37°C.
- Examine the clot after 1 hour and after 24 hours.

- Note the size, consistency of the clot and the nature of retraction (normal or reduced).
- Continue observation of clot for 72 hours to assess the clot lysis.

Normal value: Normal clot retraction shows more than 50% of serum separated at the end of 24 hours. A normal clot is firm, rubbery, elastic and not easily broken.

Interpretation: Absent or reduced clot retraction is seen in:
- Fibrinogen deficiency (congenital or acquired)
- Thrombocytopenia
- Thrombasthenia.

TESTS FOR PLATELET AND VASCULAR COMPONENT

Capillary Fragility Test (Hess test/tourniquet test)

Principle: It measures the ability of capillaries to withstand the increased stress.

Procedure

- Sphygmomanometer cuff is tied to the upper arm above the elbow and the cuff is inflated to 80 mm for 5 minutes.
- Release the pressure after 5 minutes.
- The number of petechiae present in a circle of 5 cm diameter on the flexor aspect of forearm (below the bend of the elbow) is noted.

Normal: 0 to 5 petechiae.

Interpretation: Positive test is indicated by more than 10 petechiae and is found in:
- Vessel wall abnormalities:
  - Vascular purpura
  - Scurvy
- Platelet disorders:
  - Thrombocytopenia
  - Defective platelet function.

Bleeding Time (BT)

Bleeding time is used as screening test for disorders of platelet-vessel wall interactions. It measures the time required for bleeding to stop after a standardized superficial cut of the skin capillary bed.

Methods

- Duke's method-obsolete
- Ivy's method
- Template method (method of choice).