- 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).

Template Method for BT

Template is a disposable blade fitted on to a holder made of plastic and is used for the test. The blade projects through the bottom so that the incision made through the slit is 9 mm long and 1 mm deep.

Principle: A small skin cut of a standard size and depth is made and the oozing blood is wiped with a filter paper. Bleeding stops when the capillaries contract and platelet plug seals the vessel.

Procedure

- Patient is made to sit on a chair with an arm rest, so that the forearm is steady and exposed.
- The skin of the forearm is cleaned with alcohol and allowed to dry.
- Sphygmomanometer cuff is tied to the upper arm and the cuff is inflated to 40 mm Hg.
- A site on the forearm is selected away from the superficial veins.
- Place the template 5 cm distal to antecubital crease (on volar surface).
- One cut is made using a smooth rapid movement with the template (in the *simplate/surgicutt* test, no pressure is applied to the device. On pressing the trigger an incision of 5 mm length and 1 mm depth develops).
- Immediately after the incision, a stop watch is started.
- Another cut is made 1.5-2 cm away from the first one and another stop watch is started.
- The blood oozing from the sides of the cut is blotted with filter paper (Whatman No.1), every 30 seconds until bleeding stops. Do not touch the wound edges to avoid disturbing the clot as it is formed.
- Time at which bleeding stops is noted for both cuts.
- Place a butterfly adhesive bandage over the site of puncture to avoid scarring.
- Average of the two readings is the bleeding time for the patient.

Normal Range: 2-9 Minutes

Uses

- The test is prone to problems of reproducibility, sensitivity, and specificity. Though it is one of the screening tests, it is not recommended as routine preoperative screening test.
- This test evaluates the defects of primary hemostasis. Thus, bleeding time measures the platelet-vessel wall interactions (integrity of capillary and platelet function).

  Note: The bleeding time usually is not prolonged in patients with coagulation factor deficiencies.

Interpretation

Prolonged bleeding time is found in:

- **Platelet disorders**
  - **Quantitative:** Thrombocytopenia. If platelet count is below 50,000/ mm^3, BT should not be performed as bleeding may be difficult to stop.
  - **Qualitative:** von Willebrand disease, Bernard-Soulier syndrome, Glanzmann's thrombasthenia.

- **Primary vascular disorders:** Ehlers- Danlos syndrome.
- **Platelet-vessel wall interactions:** von Willebrand disease
- **Others:** Afibrinogenemia, severe hypofibrinogenemia, uremia, aspirin.

TESTS FOR COAGULATION COMPONENT

Coagulation or Clotting Time (Lee-White Method)

It measures the time taken for the fresh blood to clot.

Procedure

- Draw 3 mL of venous blood with aseptic precautions.
- Label 3 test tubes as No. 1, 2 and 3 and keep in a water bath at 37°C.
- Deliver 1 mL of blood into each of the above 3 test tubes and start the stop watch.
- After 3 minutes, take out tube No 1, tilt it every 30 seconds till a clot develops.
- Note the time when the tube can be inverted completely.
- Next examine the tube No 2 every 30 seconds, exactly the same way as tube No 1, till the clot forms and note the time.
- Finally, invert the third test tube as above till blood clots. Stop the watch.
- Record the time from the moment blood is delivered into the test tube to the complete clotting in the third tube.
- The clotting time of the third tube is reported as the clotting time.

Normal: 4-11 Minutes

Disadvantages

Not a sensitive test: It is one of the oldest tests and is not sensitive as it fails to detect mild/moderate procoagulant defects. Hence, it is obsolete now and not recommended as a screening test. PTT is a more sensitive test for assessment of the coagulation cascade. Clotting time is prolonged only with severe deficiency of factor VIII, IX or fibrinogen (afibrinogenemia) and in heparin therapy.

Misleading: Normal value may be obtained in mild-to-moderately severe hemophilia A and B and it does not exclude major factor deficiency.

- **Other use:** Following the clotting time, the tubes can be left in the water-bath and examined after one hour for *clot retraction test.*

Specimen Collection for Coagulation Studies

- Care should be taken not to hemolyse the sample either by excessive suction during venipuncture or while delivering the blood through the needle into the vial.