

Uses

- **Screening test to evaluate coagulation disorders:** It measures coagulation factor I, II, V, VII and X. Deficiency of any one of these factors leads to prolongation of PT. It should be used along with PTT.
- **To monitor oral anticoagulant therapy.**
- **To evaluate liver function:** Liver disease can result in deficiency of the coagulation factors. Hence PT should be performed before a *liver biopsy* and *prolonged* PT is a contraindication for liver biopsy.

Interpretation: Prolonged PT is seen in:

- Liver disease
- Administration of oral anticoagulants like coumarin
- Vitamin K deficiency
 - Obstructive jaundice
 - Hemorrhagic disease of the newborn
- Deficiency of factors I, II, V, VII and X
- Disseminated intravascular coagulation (DIC)

Precautions

- The ratio of anticoagulant to blood must be 1:9.
- Avoid hemolyzed and clotted blood samples.
- Test should be performed within 2 hours of collection.
- Correction for PCV must be done.
- Test should be done at 37°C.
- Always run a control sample with the patient sample.

Prothrombin time can also be measured by the instrument called coagulometer. Semi-automated and fully automated coagulometers are now available in the market. These coagulometers should be properly calibrated and monitored regularly.

Activated Partial Thromboplastin Time (Partial Thromboplastin Time)

Principle: Activated partial thromboplastin time (APTT) is the time taken for citrated plasma to clot in the presence of a surface activator (kaolin), phospholipid and calcium. Partial thromboplastin time (PTT) is a measure of the **intrinsic** and **common coagulation pathways**.

Reagents Required

- Citrated platelet poor plasma of the patient
- Platelet substitute-commercially available phospholipid
- Surface activator (kaolin)
- Calcium chloride
- Normal control plasma

Procedure

- Pipette out 0.1 mL of plasma into a glass tube.
- Add 0.1 mL of thoroughly mixed kaolin suspension to plasma.
- Place plasma kaolin mixture in a water-bath at 37°C for 10 minutes.
- Mix 2 mL of platelet substitute suspension (phospholipid) with 2 mL of calcium chloride solution and incubate in the water-bath at 37°C.
- Deliver 0.2 mL of phospholipid-calcium chloride mixture into plasma-kaolin mixture and start the stop watch.
- Time taken for the mixture to clot is recorded.
- Record the APTT time for the control sample.
- Repeat the test with patient and control plasma. Time should be within 1 second of the previous reading.

The test can be carried out on an automated coagulometer.

Normal Range: 30-40 Seconds

Reporting: The patient's value is always to be reported with the control values in seconds. A prolongation of the patient value more than 8 seconds of the control value is considered as abnormal.

Precautions: Similar to that for prothrombin time.

Uses

- Best single screening test for coagulation disorders. This test is abnormal with deficiencies of II, V, VIII, IX, X, XI and XII.
- For screening—hemophilia A and B
- For detecting coagulation inhibitors
- For monitoring anticoagulant therapy like heparin.

Interpretation

Common causes of a prolonged **APTT** are:

- Inherited coagulation disorders—deficiency of factor II, V, VIII, IX, X, XI, XII (e.g. hemophilia A, hemophilia B)
- von Willebrand disease
- Disseminated intravascular coagulation
- Liver disease
- Heparin therapy
- Vitamin K deficiency
- Oral anticoagulant therapy