Clinical signs of coagulopathies may include petechial or ecchymotic haemorrhages, unexplained persistent haemorrhage or multiple haematomas. Terminology usually describes problems with clotting factors as clotting disorders and problems with platelets as bleeding disorders.

**Coagulopathies (all rare!)

- **Hepatic disease.** Although the liver produces a large number of factors important in coagulation bleeding disorders are uncommon as a consequence of hepatic disease
- **Vitamin K deficiency** may occur as a result of coumerol toxicity
- **Factor VIII deficiency (classic haemophilia)** has been identified in Thoroughbreds, Standardbreds, Quarterhorses and Arabs
- **deficiency of Von Willebrand’s factor** has been identified in Thoroughbreds and a Quarter horse
- **Prekallikrein deficiency** has been identified in Belgian horses, American Miniature horses and a Quarter horse
- **Glanzmann’s thrombasthenia** is a rare congenital disorder of platelets

**Vasculitis

- **Infectious, immune-mediated, toxic and neoplastic diseases** may all lead to vasculitis and result in coagulopathy (relatively common)
- **Equine Infectious Anaemia (NOTIFIABLE!)**
- **Equine Viral Arteritis (NOTIFIABLE!)**
- **Anaplasmosis**
- **Piroplasmosis**

**Thrombocytopaenia

- **Hereditary defects (rare)**
- **Bone marrow disease (see anaemia)**
- **DIC**
- **Excessive haemorrhage**
- **Thrombosis**
- **EIA**
- **Anaplasmosis**
- **Immune-mediated (primary or secondary to infection/neoplasia/drugs)**
- **Vitamin K deficiency (rare)**
The diagnostic tests that are available in practice are crude and comprise prothrombin time (PT) activated partial thromboplastin time (aPTT) and bleeding time. Further functional tests are used as research tools but are not available commercially. All tests should be compared contemporaneously with a control horse as reference ranges are unreliable due to the number of external factors that may affect the test. Values greater than 20% above the control are considered abnormal. Horses rarely develop bleeding diathesis and coagulopathies are more likely to manifest as excessive clotting and thrombus formation than excessive and uncontrolled haemorrhage.

- **PT** - (extrinsic pathway) is usually around 10-12 secs and depends on factors I, II, V, VII, and X and will be affected by coumarin-type anticoagulants, vitamin K deficiency, liver damage and general consumptive coagulopathies (DIC). Factor VII has the shortest half-life of all clotting factors so generalised clotting disorders may be detected by prolonged PT prior to prolonged aPTT.

- **aPTT** - (intrinsic and common pathways) is usually around 30-45 secs and depends on factors I, II, V, VIII, IX, X, XI, & XII and will be affected by heparin treatment, general consumptive coagulopathies (DIC), von Willebrand disease, haemophilia and probably severe hepatic failure.

- **Bleeding time** - is a crude test of platelet function whereby a small stab incision is made in the skin and blood removed every 30 secs with tissue (without touching the skin). Bleeding should cease within 5 minutes in normal horses. Bleeding time is affected by several processes including thrombocytopaenia, thrombasthenia, DIC, vasculitis, aspirin, liver and kidney failure.

- **Platelet count** - is usually >100 x 10^9/L but is very susceptible to artefactually low measured values. If thrombocytopaenia is identified in EDTA samples then measurement should be repeated on a citrate sample as the likelihood of artefactual platelet clumping is reduced when citrate is used as an anticoagulant. Bleeding disorders are generally associated with platelet counts < 20 x 10^9/L. Primary differentials for thrombocytopaenia include immune mediated disease, DIC and liver failure.

- **D-Dimer** is a product of fibrin breakdown and is increased in horses with colic, laminitis, jugular thrombosis and other inflammatory disorders. Increased concentrations may therefore give an indication of coagulopathy. D-dimer concentrations in peritoneal fluid may also be measured as an indicator of intra-peritoneal fibrinolytic activity in horses with intestinal disease. In plasma, concentrations above 1000 ng/ml are considered to indicate a coagulopathy and in colic cases a concentration > 4000 ng/ml is associated with reduced likelihood of survival.