Assessment of Bleeding Disorders in Cats and Dogs

Coagulation assessment is common when investigating a patient presenting for bleeding, exposure to rodenticides or pre-emptively (e.g. prior to liver biopsies).
Any tests of primary or secondary coagulation may be abnormal during an episode of bleeding due to consumption, loss or clotting.

The type of bleeding may help determine if a primary haemostatic defect (platelet number or platelet function) or a secondary haemostatic defect (coagulation factors) is more likely.

Clinical Manifestation of Bleeding	Most likely type of haemostatic defect
Petechiae or ecchymoses (mucus membranes, sparsely haired skin, ears)	Primary
Oozing blood from mucous membranes/gums or at sites of venipuncture	Primary
Hematomas (ecchymoses sometimes also occur)	Secondary
Bleeding into tissues, muscles or body cavities	Secondary

Investigation of Primary Haemostasis

The most common primary haemostatic defects are thrombocytopenia (immune mediated or due to platelet loss or consumption) or congenital/inherited thrombocytopathy (e.g. von Willebrand's disease). Certain drugs may affect platelet function (e.g. NSAIDs).

- **Platelet count (as part of a full blood cell count)** – to determine if thrombocytopenia is present. Spontaneous haemorrhage may occur with platelet counts <50,000/µl. Haemorrhage may occur with trauma with less marked decreases in platelet counts.

- **Examination of peripheral blood film** – to confirm thrombocytopenia and assess for breed related macrothrombocytopenia.

- **Buccal Mucosal Bleeding Time (BMBT)** – BMBT > 4 minutes in dogs and > 3 minutes in cats is abnormal and may reflect thrombocytopenia, decreased platelet function, decreased von-Willebrand factor and/or vascular wall abnormality (collagen defect or vasculitis). A special device for BMBT is required and is available to order via Vetconnect Plus or on www.idexx.co.uk/supplies. Please see below for the BMBT procedure.
  BMBT should never be performed in a patient with significant thrombocytopenia (<70,000/µl), as this may result in an increased time without providing any additional information and may result in significant and prolonged bleeding.
  BMBT is not prolonged with coagulation factor defects or deficiencies.

- **Von Willebrand Factor (VWF) Assay** – Significant decreases of VWF (VWF < 50%) may result in spontaneous bleeding or bleeding with trauma. Bleeding may also occur with less marked decreases in VWF (VWF < 70%).

- **Thromboelastography (TEG) or other platelet function testing** – These are patient side tests, usually only available in referral centres as they need to be performed immediately after sample collection on specialised equipment.

Investigation of Secondary Haemostasis

- **Prothrombin Time (PT)** – evaluates the common (factors V, X) and **extrinsic (factor VII)** pathways of coagulation.

- **Activated Thromboplastin Time (APTT)** – evaluated the common (factors V, X) and **intrinsic (factors VIII, IX, XI and XII)** pathways of coagulation.

- **Individual Coagulation Factors** – if abnormal results are obtained for PT and/or APTT, then specific factor testing may be required to determine the underlying diagnosis (e.g. deficiency of factor VIII in dogs with haemophilia A). Please call our internal medicine consultants for advice on further testing.

- **Fibrin Degradation Products (FDP) –** FDP are formed when plasmin lyses fibrinogen, fibrin, fibrin monomers or cross-linked fibrin. Increased FDP indicate plasmin activity and can be increased with disseminated intravascular coagulation (DIC), but also with other conditions (e.g. hepatic disease, neoplasia, pancreatitis).

- **D-dimers** – Usually indicate active coagulation and fibrinolysis that may occur with disseminated intravascular coagulation (DIC) or localised clotting, thrombosis or thromboembolism. They are fragments formed from the degradation of cross-linked fibrin and, as such, they are more specific than Fibrin Degradation Products (FDP).

- **Antithrombin III (AT III)** – this coagulation factor inhibitor may be decreased with consumption, loss (e.g. bleeding or with protein-losing nephropathy/enteropathy) or decreased production (e.g. liver failure). Low ATIII may predispose to thrombosis.

If you need help with selecting the most appropriate test(s) for investigation of a bleeding disorder, please contact our Internal Medicine or Clinical Pathology team on 02037 887 508.

Please note: *Angiostrongylus vasorum* can cause bleeding disorders with an array of changes in both primary and secondary coagulation parameters and some dogs can have bleeding tendencies without any changes in these parameters. Hyperfibrinolysis can also be present in a significant number of dogs infected with *Angiostrongylus vasorum*.

Patient Side Test - Buccal Mucosal Bleeding Time (BMBT)

Confirm the platelet count is normal before performing this test. **BMBT should never be performed in a patient with significant thrombocytopenia** (<70,000/µl), as this may result in an increased time without providing any additional information and may result in significant and prolonged bleeding.

Materials

- Surgicutt®. This device produces an incision of standard length and depth. It is supplied in a sterile pack and can be triggered only once. These available to order via Vetconnect Plus or www.idexx.co.uk/supplies.
- Stopwatch.
- Filter paper.
- Gauze bandage (5 cm width).

Method

Chemical restraint is not mandatory, but may may be needed for cats or less cooperative dogs. Some sedative or anaesthetic drugs may affect the BMBT.

- Position the patient in lateral/sternal recumbency.
- Fold the patient's upper lip upwards, exposing the mucosa and secure it with the gauze bandage around the muzzle (Fig. 1). This should cause only mild to moderate vascular engorgement.
- Remove the Surgicutt® from the pack and remove the safety clip. *Do not push the trigger or touch the blade slot.* The cutting blade is now exposed and should be used quickly to maintain sterility.
- Position the lancet against the buccal mucosa avoiding any obvious superficial vessels.
- Depress the trigger and simultaneously start the timer. Remove the Surgicutt® approximately 1 second after triggering.
- At 10-15 seconds blot the flow of blood with filter paper placed 2-4 mm below the incision without touching the Surgicutt® wound to avoid dislodging a forming platelet plug.
- Blot in a similar manner every 10-15 seconds until blood no longer stains the filter paper. Stop timer.

BMBT should be less the 4 min in dogs and less than 3 min in cats.

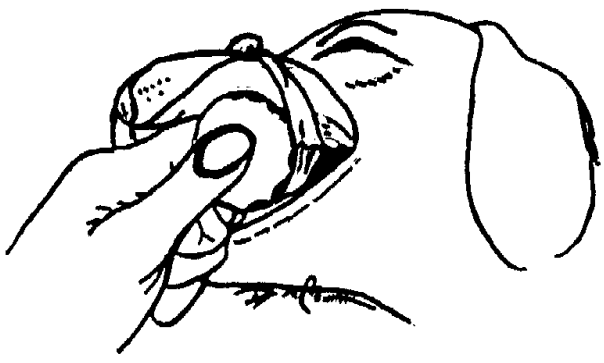

Fig. 1