

# Thrombocytopaenia: causes, treatment and management

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**Samantha Fontaine** BSc, DipAVN (Medical), RVN, discusses underlying causes and nursing considerations for this haemostatic disorder

**PLATELETS (thrombocytes) are tiny, anucleate cytoplasmic fragments that are a quarter to a half the diameter of a red blood cell. They are involved in primary haemostasis, adhering to areas of trauma and assisting in the formation of a fibrin clot. Platelets ([Figure 1](#)) originate from the bone marrow and have a circulating life span of approximately five days in the dog and 30 hours in the cat<sup>1</sup>.**

Thrombocytopaenia (low platelet count; less than  $200 \times 10^9/L$ ) is the most common acquired haemostatic disorder of dogs and cats<sup>2</sup>. Its prevalence is higher in dogs, with an apparent higher incidence in certain breeds, including cocker spaniels, poodles and old English sheepdogs<sup>3</sup>. The condition can occur for many reasons ([Table 1](#)) and patients with severe thrombocytopaenia (less than  $20-50 \times 10^9/L$ ) are at risk of a fatal haemorrhage.

Normal platelet counts:

Dog –  $200-500 \times 10^9/L$

Cat –  $300-800 \times 10^9/L$

Thrombocytopaenia: less than  $200 \times 10^9/L$

Severe thrombocytopaenia:  $50 \times 10^9/L$

## Presentation

Patients commonly present with acute-onset lethargy and general malaise. They may have petechiae (pinpoint haemorrhages) of the skin or mucous membranes. Haematomas and ecchymoses (larger areas of bruising) on the skin may be visible ([Figure 2](#)). Bleeding at the gum margins, haematuria, malaena, epistaxis, haematochezia or fresh blood in the stools may also be present<sup>2</sup>.

There may be a history of stress, such as recent kennelling, oestrus or surgery. It is important to determine whether the patient has ever travelled abroad, as some tick-borne diseases (ehrlichiosis and babesiosis) can result in thrombocytopaenia, which requires different treatment.

## Diagnosis

A clean-stick blood sample should be collected and placed in an EDTA blood tube. The blood sample should be checked for clots prior to analysis. A low platelet count from an automated blood counter should always be confirmed by manually examining a blood smear. Analysers may miscount large platelet precursors (megakaryocytes) and platelet clumps ([Figure 3](#)), which are common in cats, to give an artificially low count. Macrothrombocytes or giant platelets ([Figure 4](#)) can occur normally in breeds such as the cavalier King Charles spaniel, and these dogs tend to have lower total platelet counts<sup>4</sup>. A manual platelet count can be accurately performed using a Neubauer haemocytometer; however, a manual platelet estimate is more often the technique of choice as it is quick and easy. An example method is given in [Figure 5](#).

Other tests may be performed to determine the cause and consequences of the thrombocytopaenia, as follows.

- Full haematology, including PCV, is performed to check for infection or concurrent anaemia, and a full biochemistry panel is normally included to check general health.
- Urinalysis and gross examination of a stool sample can be carried out to check for the presence of blood and to identify areas of haemorrhage.
- A whole blood clotting time or a coagulation profile may be performed to check for adequate clotting factors and functional clotting pathways (secondary haemostasis). If the platelet count is low, a buccal mucosal bleeding time test should not be conducted as it may be difficult to stop the bleeding in the gum. No further information would be gained from this test as the results would be expected to be abnormal.
- Ultrasonography of the abdomen can reveal splenomegaly and, in patients with less severe thrombocytopaenia, an ultrasound-guided fine-needle aspirate of the spleen may be collected for cytology.

- Bone marrow sampling may be indicated, especially if neoplasia is suspected. This procedure can be performed under heavy sedation or general anaesthetic, and an aspirate and/or core sample can be collected from sites including the proximal head of the femur and the ilium.
- Tick-titre and infectious disease panels may be performed, as well as immune system function tests, such as the direct Coomb's test, antiplatelet antibody and antinuclear antibody tests.

## Treatment

Treatment choice depends largely on the cause of the thrombocytopaenia. Splenectomy may be indicated in some cases of increased sequestration, and immunosuppressive therapy may be used when immune-mediated destruction is occurring. Blood transfusions are useful in stabilising and supporting the patient while the cause of the thrombocytopaenia is investigated and treatment initiated. These should be administered with caution, however, as there is a risk of transfusion reaction and over-infusion as patients are often normovolaemic.

In cases with spontaneous bleeding or marked anaemia, a whole blood transfusion may be required. This usually only provides a temporary increase in the haematocrit and the often large volumes of blood required make it an impractical choice for most practices. The ideal blood product would be platelet-rich plasma or frozen platelet concentrate to provide a temporary increase in platelet numbers. Unfortunately, these products are not currently available in the UK<sup>5</sup>.

Where IMT is suspected, medical management in the form of immunosuppressive therapy is initiated. The only licensed product in the UK for the treatment of some auto-immune conditions in dogs and cats is prednisolone (Prednidale; Dechra Veterinary Products). All other medicines must be prescribed under the cascade and, as such, owner consent must be sought.

Adjunct therapies include azathioprine (Merck Generics UK) or cyclosporine (Atopica; Novartis Animal Health). These drugs take several days to weeks to have an effect and in the more critical patient the chemotherapy agent vincristine sulphate (Hospira) may be administered (usually as a single dose) to promote platelet budding from the megakaryocytes and reduce platelet destruction by the macrophages, usually within two to three days<sup>6</sup>.

## Nursing considerations

Nursing thrombocytopaenic patients is aimed at minimising trauma as uncontrollable bleeding could prove fatal. If admitted, the patient should be placed in a well-padded kennel and a thick mattress or lots of bedding used. Door signs should be placed on the kennel door to alert staff to the fact the patient is thrombocytopaenic ([Figure 6](#)).

## Venepuncture

The jugular vein should not be used for venepuncture. Blood samples should be collected from a peripheral vein as these vessels are at a lower pressure and a pressure bandage can easily be applied. Ideally, an intravenous (IV) cannula should be placed to facilitate blood sampling and/or medication administration. The use of intramuscular or subcutaneous injections should be avoided as the patient may be unable to form a clot at the injection site and very large haematomas can develop. If these routes must be used then pressure must be applied to the injection site for 10 minutes. Drugs should ideally be administered per os or via an IV cannula.

## **Reducing stress**

Thrombocytopaenic patients should be handled gently and any stress minimised. If they pull on their lead, a harness may be required to prevent pressure and bruising of the neck. An Elizabethan collar should also be used to prevent the patient interfering with the IV cannula as serious exsanguination could occur if the line was chewed out. If a urine sample is required, this should be a voided sample as performing cystocentesis or catheterisation of the bladder could result in trauma and bleeding.

## **Monitoring**

The patient should be monitored closely for any signs of deterioration or gross anaemia, such as haemorrhaging, collapse and respiratory distress. The appearance, location and size of any petechiae and ecchymoses should be recorded daily and any changes reported to the veterinary surgeon.

If patients are not markedly anaemic they are often relatively well in themselves and intensive nursing is not usually required. As with all patients, however, the temperature, pulse, respiration rate, capillary refill time and mucous membrane colour should be checked at least once daily. Cardiorespiratory parameters should be monitored more regularly if the patient is anaemic, especially if there is the suspicion of it decompensating and going into respiratory distress. Urination and defaecation should also be monitored closely and any changes in urine or stools recorded. Melaena often occurs and a large amount of blood can be haemorrhaged into the stomach. It should be remembered that polyuria will often occur if the patient is on high doses of steroids.

## **Nutrition**

Nutrition is very important and a highly digestible diet should be given according to the calorie requirement of the patient ( $30 \times \text{bodyweight} + 70$ ). High-dose steroids will often cause the patient to be polyphagic and if this occurs, several small meals may be more suitable than one large meal to help satiate the patient. A soft diet is preferred to prevent oral trauma from hard kibble or biscuits. The patient should not be given hard toys to chew on.

## Immunosuppressive therapy

If the patient is on immunosuppressive therapy it should be remembered that azathioprine is a cytotoxic agent and, as such, should be handled with care. Gloves should be worn, and the tablets should never be split or crushed. If the patient has received the chemotherapy agent vincristine, it will excrete cytotoxic waste for at least the next 72 hours<sup>7</sup>. Protective clothing including gloves, a long-sleeved gown, face mask and goggles should be worn when preparing and administering the vincristine (See *VN Times* 11.03; March issue, p26). Care should also be taken when handling urine, faeces, saliva and blood, and gloves should be worn. Clients should be fully educated on the administration of cytotoxic tablets and should be clearly advised on how to care for their pet while on these drugs.

## Prognosis

Patients are normally hospitalised until a response to treatment is observed or the platelet count is greater than  $50 \times 10^9/L$ . Those with neoplasia and DIC have a guarded to poor prognosis. For those patients with primary or secondary IMT, prognosis is fair to good and the majority of patients can gradually be tapered off their medications. The response to treatment for IMT is often good, with many patients leading a normal life. Owners should be made aware that relapses may occur<sup>8</sup>.

## References

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## **Manual platelet estimate:**

- Stain an air-dried smear using Diff Quik.
- Firstly, examine the smear under a low power lens ( $\times 10$ ) to check for any platelet clumps, which are often found in the feathered edge.
- Using the high power oil immersion lens ( $\times 100$ ), examine the morphology of the platelets and count the number in 10 high power fields.
- The count should be performed in the monolayer section of the smear prior to the feathered edge.