

# News

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**ANTECH**  
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## BLEEDING DISORDERS - CASE REPORT & REVIEW

Antech Diagnostics recently participated in the diagnosis of an unusual case of congenital coagulopathy.

### CASE REPORT

A 1-year old, intact male, Jack Russell terrier weighing 6 kg was presented for evaluation of bilateral epistaxis and occasional sneezing of several days' duration. There was no known history of trauma or exposure to toxins, and the backyard was fenced. Several episodes of unilateral epistaxis occurred when the dog was 8 months old. Antibiotic treatment (cephalexin, then doxycycline) failed to resolve the epistaxis. Primary differentials included nasal disease (trauma, foreign body, aspergillosis) or coagulopathy [thrombocytopenia, anticoagulant rodenticide toxicity, porto-systemic shunt, von Willebrand disease (vWD) or other heritable bleeding disorder]. Skull radiographs taken at that time were normal. The CBC was normal (PCV 37%), but the prothrombin time (PT) (23.5 s, reference range 5-10) and activated partial thromboplastin time (PTT) (31.2 s, reference range 12.5-21) were both prolonged. The epistaxis was ultimately controlled by intranasal instillation of dilute epinephrine. The dog also had a past history of occasional lameness and swelling of the right hind leg, presumably from bleeding episodes.

With the current episode, physical examination was normal other than epistaxis. No oral or cutaneous petechial hemorrhages were detected. Coagulation testing was repeated; PT was 28.5 s and the PTT was 28.7 s. The total protein, fibrinogen concentration, and platelet count were normal. Although there was no history of

exposure to toxins, the PT and PTT were repeated after a 10-day treatment trial with vitamin K1 (10 mg q 12h PO). Results were 27.4 s and 37.3 s, respectively, thereby excluding anticoagulant rodenticide toxicity as a cause of the dog's epistaxis.

Congenital factor X deficiency was considered the most likely diagnosis as it has been reported in this breed. Although hemophilias A and B are more common congenital bleeding disorders, they produce a prolonged PTT but normal PT. Deficiency of factor X, which functions in intrinsic and extrinsic pathways of coagulation, results in prolongation of both PT and PTT. Hepatic failure from a porto-systemic shunt was unlikely because the dog had shown no neurological signs, behavioral changes, or stunting of growth, and the biochemical profile was normal. Intestinal malabsorption of vitamin K1 was still considered possible, but is a rare condition (previously described only in Devon Rex cats).

Specific factor X deficiency was confirmed by finding <1% of normal factor X activity (reference range 80-175%) and normal factor VII activity. Further investigation revealed that this dog had problems with umbilical cord hemorrhage at birth. No information could be obtained regarding other puppies in the litter or episodes of hemorrhage in other related dogs, although a heritable defect is most likely. Factor X deficiency was previously documented in a family of American Cocker spaniels to be inherited as an autosomal dominant trait with variable expression. The dog has had no further bleeding in the several months since the diagnosis and remains healthy.

# BLEEDING DISORDERS (cont'd.)

## LAB TIPS

### INVESTIGATING BLEEDING PATIENTS

A review of patient signalment (age, sex, and breed) can provide important leads when investigating a possible bleeding disorder (e.g., Doberman pinschers and several other breeds have a high prevalence of von Willebrand disease; hemophilia is typically seen in young male dogs, especially of German shepherd background.) Reviewing possible anticoagulant rodenticide exposure, familial history of bleeding, and previous episodes of hemorrhage or signs compatible with hemorrhage may also offer diagnostic leads (see Table).

Clinical signs of bleeding can be helpful in assessing the likelihood that the problem is an abnormality of hemostasis (rather than bleeding attributable to local disease), trauma or surgery.

### DIAGNOSTIC CLUES FROM BLEEDING MANIFESTATIONS

#### Disorders of Primary Hemostasis

(Thrombocytopenia, thrombocytopathia, vWD, or vascular vascular abnormalities)

- Petechiae and ecchymoses common
- Hematomas rare
- Bleeding at mucous membranes
- Bleeding from multiple sites
- Bleeding disproportionate to trauma

#### Disorders of Secondary Hemostasis

(Coagulation factor defects, except except vWD (e.g., anticoagulant rodenticide toxicity, liver failure, hemophilias, etc.)

- Petechiae and ecchymoses rare
- Hematomas common
- Bleeding into muscles, joints, skin and body cavities
- Bleeding at mucous membranes
- Bleeding from multiple sites
- Re-bleeding
- Bleeding disproportionate to trauma

Laboratory evaluation begins with a comprehensive health profile (CBC, biochemical profile, and urinalysis) and basic coagulation profile (platelet count, PT, PTT, fibrinogen concentration, and d-dimer test for FDPs). A von Willebrand factor assay also may be indicated, depending on the signalment of the patient, breed, and type of hemorrhage. A mucosal bleeding time or toenail transection bleeding time may also provide helpful information (see *Antech News, March 1997* for a description of these procedures).

Proper collection and handling of blood samples for evaluation of hemostasis is critical for obtaining reliable results. Clean venipuncture, rapid transfer of blood into Vacutainer® tubes, and sufficient filling of tubes is important. The blue top tube (BTT) should be filled to **at least 75%** and preferably to full capacity. Centrifugation and transfer of plasma into a plastic tube is preferred if transport to the lab will take more than 12 hours. Freezing plasma is not required, but it should be kept cold. Samples being mailed to the lab should be shipped overnight with frozen cold packs. Plasma von Willebrand factor can be measured in samples collected into either BTT or full lavender top tubes, following the above guidelines (see *Antech News, March and November, 1997*).

Geraldine Arriola, DVM, Animal Medical Clinic, Mesa, AZ submitted this case report.

### ERYTHROPOIETIN AND PLATELETS

A recent study by Wolf et al (*Thromb. Haemost. 78: 1505-9, 1997*) showed that administration of erythropoietin (EPO) to dogs at 500 units EPO/kg/day for 5 days caused a dramatic increase in the circulating number of young platelets and their reactivity, although the total platelet count fell. The authors concluded that EPO treatment not only regulates erythrocyte production but also stimulates megakaryocytopoiesis. This raises the question of whether the increased risk of thrombosis associated with the chronically elevated EPO levels in AIHA could be caused by EPO-potentiated platelet reactivity. Also, perhaps EPO treatment would be useful in managing cases of refractory thrombocytopenia.

### PLATELETS IN CAVALIER KING CHARLES SPANIELS

Healthy members of this breed often show low circulating platelet counts and can have large platelets that sort outside the platelet "window" of automated platelet counters. These dogs do **not** require treatment for thrombocytopenia.

**References:** Dodds, J., *Lab Clin Med.* 82: pp 560-565, 1973; Knowler, et al, *J Am Vet Med Assoc.* 205: pp 1557-1561, 1994; Dodds, J., *Clin Biochem Dom Anim*, 5th ed. 1997, pp 241-283.

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