DIC (Disseminated Intravascular Coagulation)  
Drs. Foster & Smith Educational Staff

Disseminated intravascular coagulation, also known as DIC, is a disease that affects the clotting of blood. It occurs in dogs of any breed, age or sex. It is quite rare in cats.

When does DIC in dogs occur?
DIC is always secondary to another condition. These conditions can include:
- Pancreatitis
- Bloat - gastric dilatation and volvulus (GDV)
- Cancers, especially hemangiosarcoma
- Liver disease
- Kidney disease
- Heatstroke
- Overwhelming infections (sepsis)
- Trauma, especially burns and crushing injuries
- Blood transfusion reactions
- Rattlesnake bites
- Immune mediated hemolytic anemia
- Heartworm disease

How does DIC in dogs develop?
To understand how DIC develops, it helps to know how the clotting system works. In a normal animal, there are always tiny breaks that occur in the small blood vessels. The body has a clotting system that uses various proteins (called "coagulation factors") in the blood to produce a substance called "fibrin," which helps to seal up the break. Platelets, which are very small pieces of special cells circulate in the blood, and they help "plug the hole" as well. Once the vessel has healed, the clots are broken down by the body.

In DIC, because of damage to blood vessels and other causes, the blood clotting system gets activated and starts to form multiple small clots throughout the body. As many, many of these clots form, the coagulation factors are used up. Also, the clots that normally form to "fix" small breaks in blood vessels are rapidly broken down before the vessel has time to repair itself. We then have two problems: blood clots forming throughout the body, and then the inability of clots to form and remain where they should, which results in bleeding.

What are the symptoms of DIC?
The signs of DIC may include:
- Nosebleeds
- Bruising
- Blood in the urine, stool, or vomit
- Pinpoint hemorrhages that show as small red dots on the skin
- Bleeding internally
- Pale mucous membranes (eg, gums)
- Lethargy
- Weakness
- Increased heart rate
- Increased respiratory rate

DIC may be acute or chronic. Acute DIC is most often associated with excessive hemorrhage (bleeding).

How is DIC in dogs diagnosed?
There is no special test to identify DIC. Instead, the diagnosis is made based upon the combination of history and physical exam findings, and certain laboratory abnormalities related to blood clotting. Tests may include:
- Complete blood count
- Platelet assessments
- Clotting tests called prothrombin time (PT), partial thromboplastin time (PTT), and fibrinogen levels
- Tests to identify products of clot breakdown, called "fibrin degradation products" or "D-Dimers"
- Hematocrit or PCV

Ultrasound and x-rays may be performed to determine the extent of internal hemorrhage and the health of internal organs.

How is DIC in dogs treated?
The main goals of treatment of DIC include:
Treating the initial cause
• Restoring adequate blood flow to the organs through fluid therapy and possibly transfusions
• Reversing the bleeding by replacing clotting factors and platelets that have been used up
• Frequent monitoring to assess the successfulness of the treatment

The use of heparin in the treatment of DIC remains controversial.

What is the prognosis for dogs with DIC?
DIC is a very severe disease, and the prognosis for dogs with DIC is always guarded at best, and is related to the severity of the DIC and its underlying cause. Those dogs whose original disease can be treated quickly and successfully are more likely to survive DIC.