Disseminated Intravascular Coagulation in Cats

At a glance:

- Also called: DIC, consumptive coagulopathy
- About: Blood clots form inside the blood vessels which use up the blood’s clotting factors which cause massive bleeding.
- Causes: Infection, cancer, inflammatory conditions, heat stroke, snake bite, shock, trauma, heartworm.
- Diagnosis: Veterinary diagnosis is necessary along with baseline tests, blood clotting time, blood smear and imaging.
- Treatment: Treat the underlying cause and provide supportive care.

What is disseminated intravascular coagulation?

Disseminated intravascular coagulation (DIC) is a rare, life-threatening condition in which systemic activation of coagulation (clotting) occurs, resulting in the formation of blood clots (microvascular thrombosis) throughout the small blood vessels. Clotting is a vital response which serves to protect blood from being lost from damaged blood vessels, however, DIC causes blood clotting to become overactive leading to problems.
Coagulation is a process in which the blood changes from liquid to a solid/gel, which occurs when damage occurs to blood vessel walls. Normally, when the blood vessel wall is damaged, platelets, a type of blood cell, clump together and bind to the site of the damaged vessel and proteins known as coagulation factors create fibrin, which are thin, long strands, these entangle the platelets forming a mesh. Together, this forms a plug over the damaged area, preventing blood loss.

**What are the causes of DIC in cats?**

The condition is a secondary disorder to a number of underlying causes. The primary condition triggers the coagulation process. Some known causes of DIC include:

- Cancer
- Cytauxzoonosis
- Pancreatitis
- Toxoplasmosis
- Heartworm
- Inflammatory conditions
- Immune-mediated hemolytic anemia
- Hepatic lipidosis
- Heat stroke
- Sepsis
- Shock
- Infections (viral or bacterial)
- Liver disease
- Trauma
- Snakebite

**Symptoms:**

Symptoms may vary depending on the underlying condition, and if the DIC is acute or chronic.

DIC occurs in four phases:

1. The underlying disease triggers blood clots to develop in the small blood vessels.
2. Blood clots in the vessels reduce or inhibiting blood flow through the microcirculation.
3. Eventually, the increase in clotting uses up platelets and clotting factors, which in turn leads to excessive bleeding.
4. As blood flow to organs becomes compromised, other clinical features develop such as kidney or liver failure.

DIC can be acute (sudden onset) or chronic (slow and progressive). Symptoms are more severe and life-threatening in cats with acute DIC and bleeding is typically present. Chronic DIC symptoms are generally much milder and bleeding is usually not observed.

**Symptoms may include:**

- Bruising under the skin.
- Spots under the skin, which is known as *petechiae*.
- Signs of bleeding from the nose, gums, blood in the urine etc.
- Blood in the urine and/or black, tarry stools, vomiting blood.

**Signs associated with MODS (multiple organ dysfunctions) or MOFS (multiple organ failure syndrome):**

- Kidney failure such as reduced urine production, vomiting.
- Liver failure such as neurological disorders, convulsions and, coma.
- Heart failure such as difficulty breathing and increased heart rate, cardiac arrhythmias.

**Diagnosis:**

Your veterinarian will perform a physical examination of your cat and obtain a medical history from you. There is no one single test which can diagnose DIC, diagnosis is based on presenting symptoms and a range of laboratory findings. Tests may include:

- Complete blood count to evaluate for signs of infection (increased white blood cell count), regenerative or nonregenerative anemia, decreased packed cell volume, low platelet count (thrombocytopenia), an excess of hemoglobin in the blood plasma (hemoglobinemia), fragmented red blood cells (schistocytes).
- Biochemical profile may reveal hyperbilirubinemia (high bilirubin levels in the blood), azotemia (elevated BUN and creatinine levels) and increased liver enzymes.
• Blood smear examination to evaluate for schistocytes, anemia, and neutrophilia (a high number of a type of white blood cell known as a neutrophil).
• Blood clotting tests such as PT (prothrombin time) or APTT (activated partial thromboplastin time) to determine how fast it takes for the blood to clot.
• Urinalysis to check for infection and signs of kidney failure, hemoglobinuria (blood in the urine) along with bilirubinuria (bilirubin in the urine) may be present.
• Serum fibrinogen concentrations may reveal abnormally low levels.
• Ultrasound to evaluate the organs, check for tumours and signs of internal bleeding.
• X-rays of the chest and abdomen to check for tumours.

Treatments:
Identifying and treating the underlying condition is necessary along with stopping DIC. This may include:
• Transfusion of platelets, fresh or frozen fresh plasma to replace those which have been depleted in cats who are bleeding.
• Intravenous fluids to help maintain adequate blood flow to the organs.
• Careful use of the anticoagulant heparin to reduce coagulation activation.
• Blood transfusion may be necessary if your cat has become anemic.

Close monitoring is necessary while your cat is undergoing treatment.

Prognosis:
The prognosis for cats with DIC is poor, especially for cats suffering an acute episode.