

FATE: Feline Aortic Thromboembolism

FATE is a very sudden lodging of a clot in the tail end of the aorta, which partially or completely cuts off blood supply to the back legs, or less commonly other parts of the body. The aorta is the single artery that carries blood from the heart to the rest of the body. FATE can be as mild as causing temporary wobbliness, and as severe as causing complete paralysis of the back legs, followed by death of the tissues of the back legs. FATE is most commonly caused by heart disease. It occurs in cats, but has not been reported in dogs.

What Causes FATE?

FATE most commonly affects middle-aged (5-7year) cats. For some reason, it is more common in males than in females, but occurs in both. The vast majority of cats with FATE have significant heart disease at the time FATE occurs, though in many cases it is undiagnosed until the time of FATE. Other possible causes of FATE include cancer, surgery of the aorta, infection (especially sepsis – severe bacterial infection), and foreign body. On rare occasion, a predisposing condition is not identified. FATE is seen in approximately 10-20% of cats with heart disease, and is associated with congestive heart failure (CHF) in greater than 50% of cases. In congestive heart failure, one of the chambers of the heart (left atrium) can become enlarged. Blood can pool there and form a clot, which can then leave the left atrium, traveling through the aorta until it becomes lodged in a smaller artery. The most common place for it to become lodged is in the femoral arteries, which give blood supply to the back legs.

How is FATE Diagnosed?

FATE can usually be diagnosed by taking a careful history, and doing a thorough physical examination. Things a veterinarian may find on examination of a cat with FATE include:

- absent or weak hind-limb pulses
- hind-limb pain
- decreased reflexes in the back legs
- back legs that are cool to the touch
- blue colored (cyanotic) nail beds
- firm muscles on the back of the lower legs (gastrocnemius muscles)
- Weakness or paralysis of the back legs.

In cases where FATE affects other arteries near the end of the aorta, other signs might include:

- kidney failure
- gastrointestinal disease

Other tests that can be done to confirm FATE include:

- Angiogram – injecting dye intravenously, and taking x-rays of the aorta
- Ultrasound of the aorta via the abdomen (belly)
- Doppler ultrasound blood pressure is different between the front and rear limbs
- Blood sugar is different when taken from fore and hind limbs (significantly decreased in hind-limbs)
- Blood lactate is significantly increased in hind-limbs
- CT scan or MRI scan – available only at veterinary referral institutions

Ultrasound. Just after FATE occurs, clots in the terminal aorta can be especially difficult to see on ultrasound. At first, the clot looks just like blood, with in the coming days it will appear whiter on ultrasound. If the ultrasound machine being used has Doppler to measure blood flow (or lack thereof), this can be helpful.

How is FATE Treated?

Much debate exists as to the best treatment for the initial management of cats with FATE.

Diagnose and Treat underlying heart disease. If present, heart disease must be properly diagnosed in order to treat it most effectively. It may seem strange, but it is not at all uncommon for cats to live with severe heart disease for a very long time before ever showing outward signs. After all, cats spend most of their time sleeping, and sleeping more and exercising less may not be noticed as abnormal to many cat owners. When there are signs of heart failure, they are often breathing with the mouth open, breathing rapidly or deeply, or even coughing if very severe. Your vet may hear abnormal heart sounds (a heart murmur) when listening to your cat's heart, or even fluid in the lungs if congestive heart failure is severe.

The following tests might be recommended to evaluate a cat with FATE or heart disease:

- Chest x-rays – this shows whether the heart is enlarged, and whether there is congestive heart failure. It is possible to have
- Ultrasound of the heart (echocardiogram) – Measuring the chamber sizes, thickness and ability to contract of the heart can tell us a great deal about what kind of heart disease is present, if any.
- EKG – may show an abnormal heart rhythm if present, and may give clues about which parts of the heart are enlarged.
- Blood pressure – cats with heart disease get high blood pressure, and high blood pressure can cause heart disease in cats, just like in people.

If congestive heart failure is diagnosed, it may be treated with:

- Oxygen therapy, to help get oxygen to the tissues, while the heart medications begin to work
- Diuretics – to remove fluid that has collected in the lungs, around the lungs, around the heart, and in the belly.
- Vasodilators – to reduce the fluid load on the ailing heart.
- Many other medications might be recommended, depending on the specific type of heart disease that the cat has.

Pain control. Cats who have FATE almost always have at least some degree of pain, due to tissue damage caused by lack of blood supply. It is especially important to control pain in cats with heart disease, because the extra stress on the heart caused by pain can cause dire consequences. One or more of the medications below might be used. Pain control might be combined with sedation if needed.

- Morphine derivatives give by patch, IV drip, injection, or by mouth.
- Anti-inflammatories (called NSAIDs or non-steroidal anti-inflammatories), such as Metacam or aspirin.
- Sedatives such as Valium or related drugs.

Treat metabolic problems caused by the clot. Rapid tissue destruction can cause alterations of blood pH and accumulation of toxins in the blood stream. This is often treated by using intravenous fluids to flush these toxins out. If a clot cuts off blood supply to both kidneys, kidney failure might result, and will need to be treated. If tissue destruction is severe, antibiotics might be needed to prevent or treat infection.

The following tests might be recommended to check for metabolic problems:

- CBC (complete blood count) - to check for infection, inflammation, anemia, or clotting problems.
- General Health Profile – to check the general condition of the liver kidneys, blood sugar, etc.
- Urinalysis – to evaluate kidney function.
- Electrolytes and pH analysis – to look for build-up of toxins, and high potassium which can be caused by rapid tissue death. Severely high potassium can be potentially life threatening.
- Clotting tests – if there is evidence of clotting problems, or if certain anticoagulants are used.

Nutrition. Because cats with FATE are often in pain, we often have to pay special attention to keeping them eating. We may feed by hand, use appetite stimulants, or even place a feeding tube in severe cases. Food, water and medications can be easily given through feeding tubes. Cats who do not eat for long periods of time can develop liver damage, which if untreated can become very serious or even fatal.

Anticoagulants. While anticoagulants may not actually break down the body directly, they do prevent further clot formation, while the body breaks down the clot. Aspirin, Plavix, or even Heparin injections might be used. Blood thinners such as coumadin (warfarin) can be used, but are risky, and require very careful long term monitoring, to prevent severe bleeding. If heparin or coumadin/warfarin are used, blood clotting tests will need to be done frequently, to monitor therapy. If aspirin is used, it is given at a low dose every 2-3 days – cats are very sensitive to aspirin.

Vasodilators. Vasodilator therapy has been used to help "open up" circulation and improve hind-limb blood supply. Acepromazine is probably the most widely used of these medications. ACE has not been shown to improve blood supply to the hind-limbs of cats with FATE. In addition, ACE may cause a drop in blood pressure, and could compromise what little blood supply to the legs there is. ACE should be used with extreme caution in cats with FATE. Cyproheptadine is another vasodilator which is quite safe, and has the positive side effect of stimulating the appetite.

Clot Busters. Clot busters are risky business, as rapid breakdown of the clot can cause rapid release of toxins into the bloodstream, which can cause serious medical problems, including death. Though they are very risky, those who survive clot buster therapy tend to recover sooner than those who do not receive clot buster therapy. Clot busters that might be used include streptokinase and tissue Plasminogen Activator (TPA). TPA has seen very limited use in ATE in cats most likely due to its high price. Because they are so risky, clot busters are usually only administered in referral hospitals with ICU facilities.

What is the Prognosis for FATE?

Improvement shown during the first 7 days after FATE tends to tell the most about how likely recovery is. Those who never become paralyzed, or recovery limb movement within a few days tend to do very well. Those who show little improvement in motor activity after one week are not likely to regain function of their back legs. Occasionally, when FATE is severe and causes total blockage of the blood supply to the back legs, and resulting death of that tissue, FATE can be fatal in less than 24 hours, despite aggressive treatment.

Survival to discharge from the hospital has been reported to be from 30-40% in the three large studies in referral hospitals. Keep in mind that these are studies of the most severe cases which are usually paralyzed, as mild cases are not likely to be referred. Of the cats who survive a severe FATE, 35-50% of those will have another FATE within one year. Long term survival is the same for cats on aspirin when compared to cats who take warfarin. Because of the dangers of warfarin (bleeding), it is not currently recommended for preventing recurrence of FATE.