

Heartworm Disease (Dirofilariasis) in Cats

What is heartworm disease?

Heartworm disease is a parasitic infection caused by a worm whose scientific name is *Dirofilaria immitis*. Dogs are the preferred hosts, however cats can become infected as well. Within any given geographical region, the rate of infection in cats is approximately 10% of the infection rate in dogs. The life cycle of the heartworm is best understood through a discussion of canine infection. The role of cats can then be considered as an “innocent bystander” effect.

The worm’s life includes younger *larval* stages and older adult stages. Part of the cycle occurs inside the mosquito, which obtains the L_1 larval form from the bloodstream of an already-infected dog. There the L_1 develops into a stage that is infectious to other dogs (the L_3 larva). When the mosquito bites another dog, the L_3 exits in its saliva, enters the dog’s bloodstream and eventually develops into an adult worm. Although this condition is called *heartworm* disease, most adult worms actually reside within the arteries that carry blood to the lungs from the heart (the pulmonary arteries). Only in severe infections do some worms “back up” into the chambers of the heart. Female adult worms produce offspring called *microfilariae*, which develop into L_1 larvae in the bloodstream. When the dog is bitten by another mosquito, the cycle continues.

Like dogs, cats enter this cycle after being bitten by a mosquito carrying infective L_3 larvae. Several differences exist, however, regarding heartworm disease in cats as compared with dogs. For example, cats bitten by infective mosquitoes are less likely to develop heartworm disease than dogs. If the L_3 larvae do develop into adult worms, they tend to be smaller and fewer in number as compared with canine infection. They are also less likely to produce microfilariae, making it unlikely that the infection will be passed along to other animals. Nonetheless, the resulting damage can be significant for the infected cat.

How is heartworm disease diagnosed?

Symptoms of heartworm disease in cats are nonspecific and may not always prompt immediate suspicion for this condition, particularly in northern states where it is less common. Signs of infection may include coughing, difficulty breathing, anorexia, vomiting, weight loss, lethargy, weakness, collapse, and even sudden death with or without prior symptoms.

Specific diagnosis of heartworm disease in cats is challenging. In dogs, infection is confirmed using an *antigen* test, a blood test that detects a protein produced only by the female adult worm. Since canine infections often include dozens of worms, the likelihood of female worms being present is high, making diagnosis straightforward. In cats, smaller infections including only male worms are common, reducing the usefulness of the antigen test. Instead, an *antibody* test is used first. Antibodies indicate that the immune system has been exposed to heartworms. They will be detected if a cat is currently infected *or* previously infected. If this test is positive, then an antigen test is performed in an attempt to confirm active infection. If the antigen test is negative, another blood test can be used to look for microfilariae, however the utility of this test is also limited since less than 20% of infected cats have detectable microfilariae (vs. 80-90% of dogs).

An echocardiogram (ultrasound examination of the heart) is helpful and sometimes required if the diagnosis remains in question. It may reveal visible worms inside the chambers on the right side of the heart, and also allows assessment of the size of those chambers and the pressure within the pulmonary arteries. Chest x-rays provide a “big picture” view of the heart, the lungs, and the pulmonary arteries. Characteristic changes in the appearance of the lungs and pulmonary arteries, in particular, lend support for the diagnosis of heartworm disease and give valuable information as to the overall severity of the infection. Screening bloodwork and urine analysis should be performed in all cats with heartworm disease. While most cats have only mild abnormalities or none at all, the kidneys and liver may be affected in more severe cases.

How is heartworm disease treated?

Just as the diagnosis of feline heartworm disease is problematic, so too is its treatment. The medication that is used to kill adult worms in dogs (*melarsomine*, brand name *Immiticide*) is associated with an unacceptable likelihood and degree of toxicity in cats. For this reason, it is not approved for the treatment of feline heartworm disease. There is evidence that the drug *ivermectin* (brand name *Heartgard*) slowly kills heartworms even at the low dose at which it is used as a preventive agent. Therefore, monthly administration of ivermectin is begun at the time of diagnosis and continued indefinitely thereafter. In addition, since many of the symptoms of heartworm disease are the result of inflammation caused by the worms, anti-inflammatory agents (e.g. steroids or aspirin) are sometimes used, particularly during more symptomatic periods.

In the most severe cases involving visible worms within the heart, surgical extraction of those worms can be attempted. The obvious advantage of doing so is that a potentially significant part of the infection may be quickly removed, resulting in a lower total worm burden. This procedure carries its own risks, however, and breakage of worms can result in fatal anaphylactic reactions.

What is the prognosis? What should I watch for?

The prognosis for cats diagnosed with heartworm disease is variable and depends upon the number of worms present, the body’s inflammatory response to those worms, and the disturbance of blood flow that occurs when worms die. Some cats may display no symptoms at all or only mild ones such as intermittent **coughing**. Others exhibit more frequent and severe coughing, and may have more vague and nonspecific symptoms as mentioned earlier such as **lethargy, anorexia, vomiting, and weight loss**. The most dangerous and life-threatening periods occur when worms die and obstruct blood flow through the pulmonary arteries. This may result in the sudden onset of **weakness, collapse, difficulty breathing**, or death.

Even the milder of these symptoms, if new, should prompt phone contact with either your regular veterinarian or the Angell Animal Medical Center Cardiology Service. Depending on the circumstances, short-term use of an anti-inflammatory medication may be considered. More severe problems, such as any increase in the rate or effort of breathing, warrant emergency evaluation. In such cases, hospitalization may be recommended for supplemental oxygen administration, continuous monitoring, and supportive care.