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## HEARTWORMS IN CATS

Heartworms are 9-11" long worms that live in a cat's heart or in the arteries going to the lungs (pulmonary arteries). Although they occur commonly in dogs, most people do not consider them a problem for the cat. However, recent studies of cats with heart and respiratory diseases have found an incidence of heartworms that is far greater than we previously thought.

### ***How are heartworms transmitted to a cat?***

Heartworms are transmitted through mosquitoes. When an infected mosquito bites a cat, it deposits baby heartworms (larvae). The larvae migrate and mature for several months, ending up in the right side of the heart and the pulmonary arteries. They mature into adult heartworms about six months from the time they enter the cat. Shortly thereafter, they begin to release immature heartworms, known as microfilaria. Microfilaria live in the cat's blood for about one month. They are ingested by mosquitoes feeding on the cat. (However, most mosquitoes acquire microfilaria by feeding on heartworm-infected dogs.) Because of their life cycle, it is necessary for a cat to be bitten by a mosquito to be infected with heartworms. Heartworms are not transmitted directly from one cat to another nor from a dog directly to a cat.

### ***How are heartworms diagnosed?***

There are several methods used in diagnosing heartworms; unfortunately, none are 100% reliable so a combination of tests is often needed. The diagnostic sequence usually progresses as follows:

#### **Clinical Signs**

One of the difficult things about diagnosing heartworms is that there are no consistent clinical signs. The most common signs are coughing and rapid breathing. However, both can be caused by several other diseases. Other common clinical signs include weight loss and vomiting, also common in other diseases. Some cats seem to be normal, then die suddenly. This happens due to a reaction within the lungs to the young heartworms or when dead or live heartworms enter the pulmonary arteries and obstruct the flow of blood to the lungs.

#### **Blood Tests**

**1.** There are two relatively new tests that are proving to be very helpful in diagnosing heartworms. The **heartworm antibody test** determines that the cat's immune system has been exposed to heartworms. A positive test may indicate that an active infection is present.

However, cats who have had heartworms but whose heartworms have died will also have antibodies for an unknown period of time; suspected to be 2-4 months. Cats with late stage larvae that are not yet adults and cats with adult heartworms in places other than the heart may also test positive with the antibody test. This test is very sensitive, so it is used first. However, if it is positive the next test is performed.

**2.** The next test is the **heartworm antigen test**. This detects the presence of adult female heartworms. It is very specific, but not as sensitive. A positive test indicates that heartworms are present, but a negative test does not mean that they are absent. Because the cat must have at least two adult female worms present to make this test positive, a negative test may mean that the cat may only have a small number of worms or that all the worms present are male.

In summary, a diagnosis of heartworms is confirmed if **both** the antibody and antigen tests are positive.

It should be noted that most veterinarians are able to perform an in-hospital test to detect heartworm antigen in dogs. However, the canine test is not as sensitive as the test for cats and it is an antigen test so using it will result in more false negative results.

**3.** Blood can be tested for the presence of **microfilaria**. However, less than 10% of cats with heartworms have microfilaria in their blood, and microfilaria are only present for 1-4 weeks. Therefore, a negative test means little.

**4.** Cats suspected of heartworms can be tested for their level of **eosinophils**. Eosinophils are normal white blood cells that occur in increased numbers when certain parasites are present. They are elevated in the presence of heartworms, but this elevation only occurs for a few months. In addition, cats with intestinal parasites ("worms") and allergies also commonly have increased eosinophil counts.

## Radiographs

**Radiographs** (x-rays) permit us to view the size and shape of the heart. They also allow us to measure the diameter of the pulmonary arteries. Many cats with heartworms have an increase in the size of the pulmonary arteries; they may suddenly come to an apparent stop (blunted) on their way to the lungs due to worms obstructing them. However, many cats with heartworms have no abnormal findings on their radiographs, especially early in the infection.

An **angiogram** is an x-ray study in which contrast material (dye) is injected into the heart or veins and is seen as it goes through the pulmonary arteries. This illuminates the arteries so they can be seen better. There is some risk to this procedure so it is not used often.

## Ultrasound

An **ultrasound** machine produces an image of internal organs and structures without the use of radiation. It is a testing procedure that is becoming more and more common in veterinary practices. With it, one is able to view the internal structures of the heart and the pulmonary arteries. In some cats, the actual heartworms can be seen; this finding confirms the presence of heartworms. However, in many cats the worms are not seen.

### ***Can heartworms be treated?***

There is no drug approved for treating heartworms in cats. One of the drugs for treating dogs has been used in cats, but there are potential side-effects. Another problem is that when the heartworms die they pass through the pulmonary arteries to the lungs. This can result in sudden death. Thus, we have a dilemma when a cat is diagnosed with heartworms. One of two choices must be made:

- 1.** Treat with the drug designed for dogs. However, this is a drug that has been shown to have side-effects in cats. These side-effects include acute pulmonary (lung) failure and death in a small percentage of cats.
- 2.** Treat the symptoms of heartworm disease and hope the cat outlives the worms. Since heartworms live in a cat for about two years, several months of treatment are needed. When cats are in a crisis, they are treated with oxygen, corticosteroids ("cortisone") to relieve the reaction occurring in the pulmonary arteries and lungs, and, if needed, drugs to remove fluid from the lungs (diuretics). When they are stable, they are treated continuously or periodically with corticosteroids. However, the threat of an acute crisis or sudden death always exists.

### ***Is there a way to prevent heartworms?***

It is strongly recommended that dogs take drugs to prevent heartworms. It is well accepted that even dogs in cold climates should be on heartworm prevention at least part of the year. Now, some of the same drugs are formulated for cats. Therefore, prevention of heartworms is safe and easy. The reasons that heartworm prevention should be considered for your cat are:

- 1. Diagnostic Difficulty.** Diagnosing heartworms is not as easy in cats as in dogs. A simple and reliable in-hospital blood test is not yet available, and the tests that are most reliable must be sent to an outside laboratory. Often, radiographs or ultrasound studies are needed to confirm the diagnosis. Many cats are diagnosed with an autopsy following sudden death.
- 2. Incidence Unknown.** Heartworms are not nearly as common in cats as they are in dogs. However, they are probably more common than we realize. As we look more aggressively for heartworms in cats with better and better tests, we expect to find that the incidence is greater than we thought in the past.
- 3. No Good Treatment.** There is no good treatment for heartworm-infected cats. Effective drugs are not available, and cats that seem to be doing well may die suddenly. Treating heartworm infections in cats is risky, and not treating these cats is just as risky. If they are cured of the disease, it takes about two years.
- 4. Prevention Easy.** Cats given heartworm prevention drugs have not shown signs of toxicity. Since they only have to be given once each month and since they are formulated so that cats will eat them readily, administration is not a problem (in most cats). There is a wide margin of safety, even in kittens as young as six weeks of age.

5. **Indoor Cats Also.** Exposure to mosquitoes is required for transmission. Cats do not have to be exposed to cats or dogs infected with heartworms. Obviously, cats that go outdoors are more likely to be exposed; however, about 25% of cats that are diagnosed with heartworms are reported by their owners to be indoor only. This simply means that mosquitoes that come into the house are just as dangerous as the ones outdoors.