

HEARTWORM DISEASE

About the Diagnosis

Heartworms are a parasite of dogs and other canine species, such as foxes. Cats can also be affected, although they are more resistant to infection. Very rarely, a few cases have also been reported in people.

Heartworms are transmitted by mosquitoes. Once limited to the southern regions of the United States, heartworms are now found in most areas of the country.

Mosquitoes inject a larval (immature) stage of the heartworm parasite, *Dirofilaria immitis*, into the dog or cat when they feed. The larvae mature into thin, adult worms that are several inches long. Adult heartworms live in the arteries of the lungs (pulmonary arteries) and in the heart. By their physical presence, they cause harm in two ways: they block the normal forward flow of blood, causing an excessive workload on the heart, and they also damage the inner lining of the blood vessels, which gives rise to blood clots that cut off circulation to parts of the lungs. Adult heartworms reproduce and release the next generation of immature larval worms, called microfilaria, into the bloodstream. Mosquitoes feeding on an infected dog pick up microfilaria and may then transmit the disease to another animal.

The presence of worms in the pulmonary arteries causes damage that is related to the number of worms and the length of time they are present. Blood clots may form, or heartworms may die, forming an embolus (a blockage) that becomes lodged in a smaller artery, cutting off circulation to a part of the lungs. A large embolus can be fatal. Alternatively, but equally devastating, large numbers of worms can progressively obstruct blood flow to the point that heart failure develops.

Cats typically are infected with only a few worms, often only one or two. Damage to the pulmonary arteries is similar to those in dogs. The formation of an embolus in a cat is often fatal.

Symptoms: Dogs infected with a few worms may not show any outward signs of infection. More heavily infected dogs will cough and tire easily with exercise. In addition, severe infections may cause weight loss and fluid accumulation in the abdomen because of circulatory disturbances (congestive heart failure).

Heartworm infections in cats may cause coughing or vomiting. Sudden, severe breathing difficulty and death are also possible, as a result of an embolus (clot) to part of the lungs.

Diagnosis: Several tests are available to diagnose heartworms in dogs. Examination of a blood sample under a microscope may reveal microfilaria (larval worms), but this older approach fails in a significant portion of dogs with heartworms. A certain percentage of infected dogs do not have microfilaria in the blood, so a superior test is the type that detects antigens (substances secreted by adult heartworms) in a dog's blood. These tests are the diagnostic test of choice for screening for heartworms in dogs: they will detect almost all infections in dogs and are widely available at veterinary clinics. Radiographs (x-rays) of the chest are necessary in dogs that test positive for heartworms: they show changes in the lungs and heart outline that are characteristic of heartworm disease and allow an assessment of the severity of the disease. Likewise, echocardiography (ultrasound study of the heart) helps determine the extent of damage caused by the heartworms in some very advanced cases and may even allow visualization of the worms inside the heart.

Detection of heartworms is more difficult in cats. Microfilaria are seldom present, so tests that detect heartworm antigen or antibodies to heartworms are used. However, the small number of worms usually present in cats means that these tests are not as accurate as those used in dogs. Changes in the lungs and arteries can be detected with x-rays. Echocardiograms or less commonly angiograms (where dye is injected into the bloodstream prior to an x-ray) may allow visualization of the worms in the heart or pulmonary arteries. In general, blood tests (heartworm antibody test) and echocardiography are the two forms of heartworm screening that work reasonably well in cats.

Living with the Diagnosis

Dogs with heartworm disease should be treated with medication to kill the heartworms unless they have a medical condition that prevents treatment. If treatment is not possible, the dog should be placed on monthly heartworm prevention medication to prevent infection with additional worms; symptoms of heartworm-related illness, should they occur, are treated as they arise. Cats with heartworm disease are usually not treated because medications

used for eliminating adult heartworms are extremely hazardous to cats: about 20-30% of heartworm-infected cats die during treatment. Therefore, infected cats should be placed on monthly preventive medication only and watched for problems. If breathing difficulty occurs, emergency treatment should be sought. Fortunately, cats are more able to clear heartworm infections on their own (on a scale of several months) than dogs are (takes a few years, which allows ongoing and often fatal damage to occur in the heart).

Perhaps the most important aspect of heartworm infection to remember is that most animals with heartworms have serious, potentially life-threatening complications that can occur as a result, yet they appear perfectly well externally. The lack of symptoms at any given time should not be taken as a reason to postpone or avoid treatment for heartworm disease.

More information is available at an excellent nonprofit, authoritative veterinary website for heartworm disease: www.heartwormsociety.org.

TREATMENT

Dogs are hospitalized and given a series of injections to slowly kill the adult worms. The medication usually kills the worms over a period of 2 to 4 weeks. If microfilariae are present in the blood, a separate treatment is necessary at a later date to eliminate them. After treatment, it is **critically important** to keep the dog confined and to restrict exercise for 4 weeks. The heartworm medication kills the worms slowly; if activity such as running, jumping, or playing is allowed at any time in the 4 weeks following injections to kill heartworms, a large clump of dying heartworms may break free and block the circulation to the lungs. This produces varying degrees of circulatory failure, which causes symptoms ranging from coughing and loss of appetite to, frequently, sudden death. Therefore, even in the most energetic and healthy-looking dog, it is **essential** to halt all physical activity except three 3 to 5 minute leash walks daily (to urinate and defecate) for 4 weeks and then to reintroduce physical activity slowly for the following 2 weeks.

No treatment to kill adult worms is used in cats. The worms will die naturally within a year. Episodes of breathing difficulty or other symptoms are treated with medication should they occur.

Note that these precautions and warnings apply only to treatment in the form of injections that are given to kill adult heartworms. The medication routinely given every month to **prevent** heartworm infection in the first place is extremely safe and carries none of the risks described above.

DOs

- Administer heartworm prevention to your pets as recommended by your veterinarian. In some areas, preventive medication must be given all year; in other areas, treatment is only needed during the summer. Cats and dogs should be on a heartworm prevention program that includes annual blood testing (dogs only), even if medication is given year-round. Realize that heartworm preventatives given regularly on a monthly basis are more than 99% effective.
- For dogs that have developed heartworm disease and have received treatment in the form of injections to kill the adult heartworms, for 4 to 6 weeks after treatment, keep your dog confined and do not allow it to exercise. When not confined to the house or a small pen, the dog should be on a leash. Call your veterinarian immediately if your dog begins to cough or seems not to feel well.

DON'Ts

- Don't stop heartworm prevention during the winter unless instructed to do so by your veterinarian. Warmer climates require year-round prevention measures.
- Don't assume that having a long hair coat or being indoors most of the time means a pet is protected from mosquitoes and will not get heartworms. Many long-haired dogs and cats become infected with heartworms, and approximately 1/3 of cats with heartworm disease are reported as living 100% indoors.
- Don't interpret a cat's coughing as automatically being due to asthma. Many cats that formerly were thought to have asthma have been found to have heartworms instead (the symptoms are identical, but blood testing and x-rays/ultrasound can help tell the difference).

When to Call Your Veterinarian

- If your cat with heartworm disease has sudden severe breathing difficulty. This is an emergency.

- After treatment (injections) for adult heartworms, if your dog starts to cough or stops eating.

Signs to Watch For

- Dogs: coughing, exercise intolerance, loss of appetite, swollen belly.
- Cats: coughing, vomiting, breathing difficulty.

Routine Follow-Up

- Dogs should be retested for heartworms 3 to 4 months after treatment to confirm that all worms were killed. Occasionally, a second treatment is needed to kill all the worms. Healthy dogs on a prevention program should be tested for heartworms annually or as recommended by your veterinarian.